

# NASA Scientific and Technical Publications

*A Catalog  
of  
Special Publications,  
Reference Publications,  
Conference Publications, and  
Technical Papers  
1977 - 1986*

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Scientific and Technical Information Division 1987  
National Aeronautics and Space Administration  
Washington, DC



# PREFACE

The pursuit of human knowledge through scientific research and technical endeavor has vastly expanded understanding of our world and universe. The contributions of NASA in scientific and technical research and development affect not only our understanding and use of aeronautics and space but also touch our daily lives. Geologists, oceanographers, meteorologists, aircraft engineers, aerospace decision-makers, land-use planners, historians, and rescue teams all make use of the results of NASA's research. These findings are published as part of NASA's mandate to disseminate the results of the agency's far-reaching research and development.

The purpose of this catalog is to provide a listing of NASA publications from four series in the NASA scientific and technical information database entered during the years 1977 through 1986. An earlier catalog, *Records of Achievement*, NASA SP-470, accession number N83-33792, is available for a listing of earlier NASA publications not covered by this catalog. For non-NASA publications, consult two semimonthly abstract journals which cover all aspects of aeronautics and space research and development and applications, nationally and worldwide: *STAR (Scientific and Technical Aerospace Reports)*, which focuses on scientific and technical reports, and *IAA (International Aerospace Abstracts)*, which covers the open literature. These are available by subscription from, respectively, the U.S. Government Printing Office and the American Institute of Aeronautics and Astronautics, Inc., 555 West 57th Street, New York, NY 10019 (212-247-6500).

Specifically, this catalog includes those publicly available reports in four NASA report series: Special Publications (SPs), Reference Publications (RPs), Conference Publications (CPs), and Technical Papers (TPs). The type of presentation determines the series.

*Special Publications* are often concerned with subjects of substantial public interest. They report scientific and technical information derived from NASA programs and are for audiences of diverse technical backgrounds.

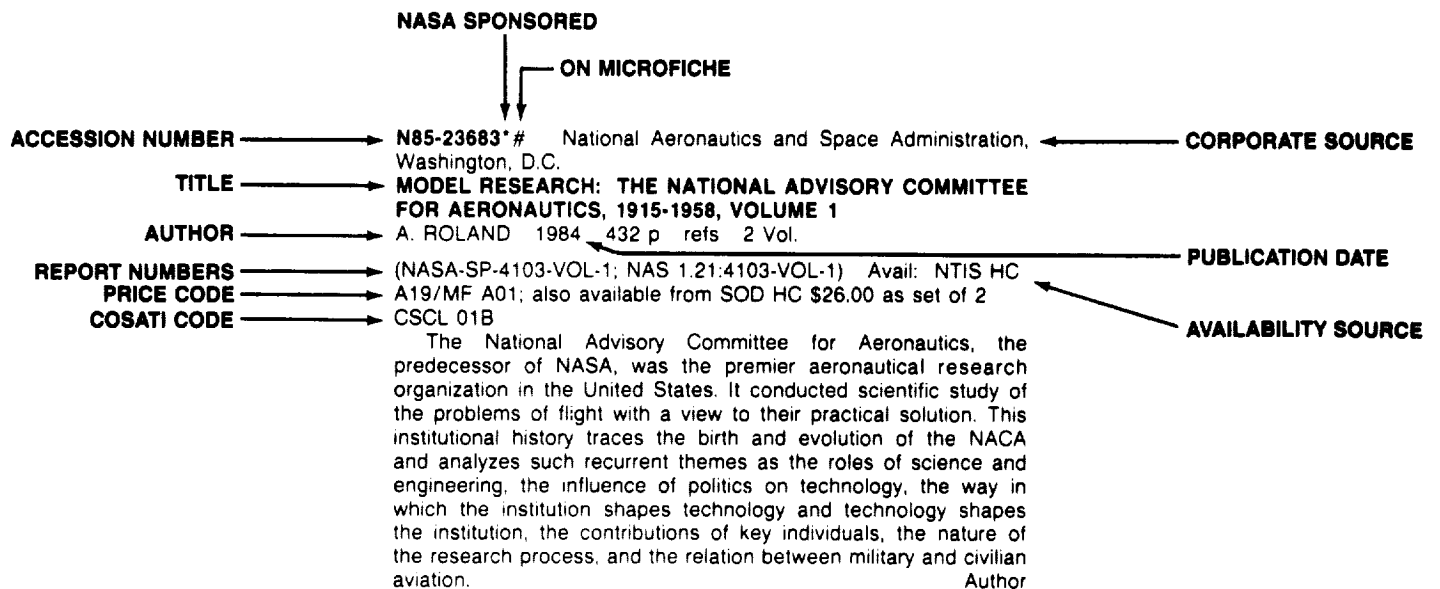
*Research Publications* contain compilations of scientific and technical data deemed to be of continuing reference value.

*Conference Publications* record the proceedings of scientific and technical symposia and other professional meetings sponsored or cosponsored by NASA.

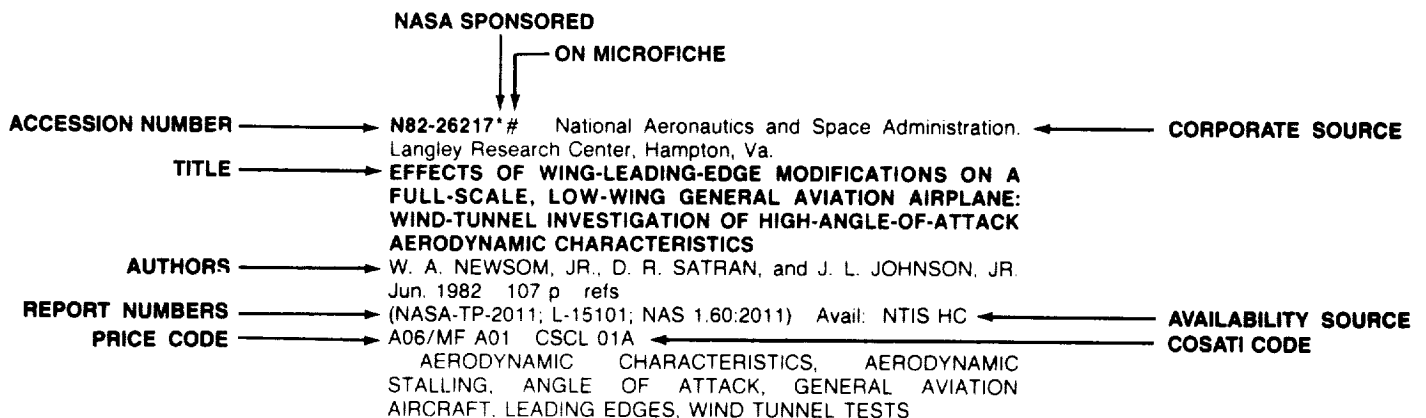
*Technical Papers* present the results of significant research conducted by NASA scientists and engineers.

Presented here are the citations for each of these publications. An explanation of the elements in typical citations follows. Please note that these publications are available for purchase either from the U.S. Government Printing Office for a limited time, depending upon public demand, or indefinitely from the National Technical Information Service (NTIS). They are also available at any Federal Regional Depository Library. Availability information follows, including current NTIS price schedules, which are keyed to the price code in the citation.

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Includes elementary and nuclear particles; and reactor theory.	
For space radiation see <i>93 Space Radiation</i> .	
<b>74 OPTICS</b>	<b>193</b>
Includes light phenomena and optical devices.	
For lasers see <i>36 Lasers and Masers</i> .	
<b>75 PLASMA PHYSICS</b>	<b>194</b>
Includes magnetohydrodynamics and plasma fusion.	
For ionospheric plasmas see <i>46 Geophysics</i> . For space plasmas see <i>90 Astrophysics</i> .	
<b>76 SOLID-STATE PHYSICS</b>	<b>195</b>
Includes superconductivity.	
For related information see also <i>33 Electronics and Electrical Engineering</i> and <i>36 Lasers and Masers</i> .	
<b>77 THERMODYNAMICS AND STATISTICAL PHYSICS</b>	<b>195</b>
Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics.	
For related information see also <i>25 Inorganic and Physical Chemistry</i> and <i>34 Fluid Mechanics and Heat Transfer</i> .	
<b>SOCIAL SCIENCES</b>	
Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law, political science, and space policy; and urban technology and transportation.	
<b>80 SOCIAL SCIENCES (GENERAL)</b>	<b>196</b>
Includes educational matters.	
<b>81 ADMINISTRATION AND MANAGEMENT</b>	<b>196</b>
Includes management planning and research.	
<b>82 DOCUMENTATION AND INFORMATION SCIENCE</b>	<b>197</b>
Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography.	
For computer documentation see <i>61 Computer Programming and Software</i> .	
<b>83 ECONOMICS AND COST ANALYSIS</b>	<b>N.A.</b>
Includes cost effectiveness studies.	

<b>84 LAW, POLITICAL SCIENCE AND SPACE POLICY</b>	<b>N.A.</b>
Includes NASA appropriation hearings; aviation law; space law and policy; international law; international cooperation; and patent policy.	

<b>85 URBAN TECHNOLOGY AND TRANSPORTATION</b>	<b>198</b>
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.	
For related information see <i>03 Air Transportation and Safety</i> , <i>16 Space Transportation</i> , and <i>44 Energy Production and Conversion</i> .	

## SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

For related information see also *Geosciences*.

<b>88 SPACE SCIENCES (GENERAL)</b>	<b>199</b>
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<b>89 ASTRONOMY</b>	<b>201</b>
Includes radio, gamma-ray, and infrared astronomy; and astrometry.	

<b>90 ASTROPHYSICS</b>	<b>203</b>
Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.	
For related information see also <i>75 Plasma Physics</i> .	

<b>91 LUNAR AND PLANETARY EXPLORATION</b>	<b>204</b>
Includes planetology; and manned and unmanned flights.	
For spacecraft design or space stations see <i>18 Spacecraft Design, Testing and Performance</i> .	

<b>92 SOLAR PHYSICS</b>	<b>209</b>
Includes solar activity, solar flares, solar radiation and sunspots.	
For related information see <i>93 Space Radiation</i> .	

<b>93 SPACE RADIATION</b>	<b>210</b>
Includes cosmic radiation; and inner and outer earth's radiation belts.	
For biological effects of radiation see <i>52 Aerospace Medicine</i> . For theory see <i>73 Nuclear and High-Energy Physics</i> .	

## GENERAL

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.

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Note: N.A. means that no abstracts were assigned to this category for this issue.

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**AERONAUTICS (GENERAL)**

**N77-17996\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PROCEEDINGS OF THE SCAR CONFERENCE, PART 1**

1976 478 p refs Conf. Proceedings held at Hampton, Va., 9-12 Nov. 1976 2 Vol.

(NASA-CP-001-PT-1) Avail: NTIS HC A21/MF A01 CSCL 01C  
AERODYNAMIC CONFIGURATIONS, CONFERENCES, SUPERSONIC AIRCRAFT, SUPERSONIC SPEED

**N77-18019\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PROCEEDINGS OF THE SCAR CONFERENCE, PART 2**

1976 547 p Conf. held at Hampton, Va., 9-12 Nov. 1976

(NASA-CP-001-PT-2) Avail: NTIS HC A23/MF A01 CSCL 01C  
CONFERENCES, SUPERSONIC AIRCRAFT, TECHNOLOGY ASSESSMENT

**N77-21022\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLUTTER TESTING TECHNIQUES**

1976 483 p Conf. Proc. held at Dryden Flight Res. Center in Edwards, Calif., 9-10 Oct. 1975

(NASA-SP-415) Avail: NTIS HC A21/MF A01 CSCL 01C  
Developments in methodology and data analysis techniques for flutter testing in flight and on the ground are discussed.

**N77-32072\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A STUDY OF THE SONIC-BOOM CHARACTERISTICS OF A BLUNT BODY AT A MACH NUMBER OF 4.14**

H. W. CARLSON and R. J. MACK Sep. 1977 31 p refs

(NASA-TP-1015; L-11456) Avail: NTIS HC A03/MF A01

CSCL 20A

BLUNT BODIES, PRESSURE DISTRIBUTION, SONIC BOOMS

**N78-12999\*#** Texas A&M Univ., College Station. Flight Mechanics Lab.

**AGRICULTURAL AVIATION RESEARCH**

H. L. CHEVALIER, comp. and L. F. BOUSE, comp. (Agricultural Research Service, College Station, Tex.) 1977 151 p Proc. of Workshop held at College Station, Tex., 19-21 Oct. 1976

(NASA ORDER L-49862-A)

(NASA-CP-2025) Avail: NTIS HC A08/MF A01 CSCL 01C

AERONAUTICS, AGRICULTURE, AIRCRAFT PERFORMANCE

**N78-25048\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

**PRECISION POSITIONAL DATA OF GENERAL AVIATION AIR TRAFFIC IN TERMINAL AIR SPACE**

W. E. MELSON, JR., L. C. PARKER, A. M. NORTHAM (Computer Sciences Corp., Wallops Island, Va.), and R. P. SINGH (Computer Sciences Corp., Wallops Island, Va.) May 1978 13 p

(NASA-RP-1020) Avail: NTIS HC A02/MF A01 CSCL 02A

Three dimensional radar tracks of general aviation air traffic at three uncontrolled airports are considered. Contained are data which describe the position-time histories, other derived parameters, and reference data for the approximately 1200 tracks. All information was correlated such that the date, time, flight number, and runway number match the pattern type, aircraft type, wind, visibility, and cloud conditions. Author

**N78-25049\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INTERACTION OF A TURBULENT-JET NOISE SOURCE WITH TRANSVERSE MODES IN A RECTANGULAR DUCT**

G. P. SUCCI (MIT, Cambridge, Mass.), K. J. BAUMEISTER, and K. U. INGARD (MIT, Cambridge, Mass.) Jun. 1978 42 p refs

(NASA-TP-1248; E-9462) Avail: NTIS HC A03/MF A01 CSCL 20A

ACOUSTIC DUCTS, MODES (STANDING WAVES), NOISE (SOUND), SINGULARITY (MATHEMATICS), TURBULENT JETS

**N78-27046\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CTOL TRANSPORT TECHNOLOGY, 1978**

Jun. 1978 516 p refs Conf. held at Hampton, Va., 28 Feb. - 3 Mar. 1978

(NASA-CP-2036-PT-1; L-12178) Avail: NTIS HC A22/MF A01 CSCL 02A

AIRCRAFT DESIGN, COMMERCIAL AIRCRAFT, CONFERENCES, TECHNOLOGY ASSESSMENT, TRANSPORT AIRCRAFT

**N78-29046\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CTOL TRANSPORT TECHNOLOGY, 1978**

1978 405 p refs Conf. held at Hampton, Va., 28 Feb. - 3 Mar. 1978

(NASA-CP-2036-PT-2; L-12178) Avail: NTIS HC A18/MF A01 CSCL 02A

AIR TRANSPORTATION, AIRCRAFT DESIGN, CONFERENCES, TRANSPORT AIRCRAFT

**N79-15898\*#** National Aeronautics and Space Administration, Washington, D.C.

**AVIONICS AND CONTROLS RESEARCH AND TECHNOLOGY**

H. A. REDIESS, ed. and D. E. MCIVER, ed. 1979 84 p Workshop held at Hampton, Va., 27-28 Jun. 1978

(NASA-CP-2061; L-12498) Avail: NTIS HC A05/MF A01

CSCL 02A

AVIONICS, CONFERENCES, FLIGHT CONTROL

## 01 AERONAUTICS (GENERAL)

**N79-16796\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **GENERATION OF LINEAR DYNAMIC MODELS FROM A DIGITAL NONLINEAR SIMULATION**

C. J. DANIELE and S. M. KROSEL Feb. 1979 95 p refs  
(NASA-TP-1388; E-9490) Avail: NTIS HC A05/MF A01 CSCL 02A

AIRCRAFT ENGINES, CONTROL THEORY, DIGITAL SIMULATION, DYNAMIC MODELS, ENGINE CONTROL, OPTIMAL CONTROL

**N79-19989\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ADVANCED TECHNOLOGY AIRFOIL RESEARCH, VOLUME 1, PART 2**

1978 303 p refs Proceedings of Conf. held at Hampton, Va., 7-9 Mar. 1978

(NASA-CP-2045-PT-2; L-12232-VOL-1-PT-2) Avail: NTIS HC A14/MF A01 CSCL 02A

AIRFOILS, WIND TUNNEL TESTS

**N79-23008\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **COMPUTER FORMULATIONS OF AIRCRAFT MODELS FOR SIMULATION STUDIES**

J. C. HOWARD May 1979 73 p refs  
(NASA-TP-1470; A-7477) Avail: NTIS HC A04/MF A01 CSCL 02A

AIRCRAFT MODELS, COMPUTERIZED SIMULATION, MATHEMATICAL MODELS, SYMBOLIC PROGRAMMING

**N79-23889\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **THE SCIENCE AND TECHNOLOGY OF LOW SPEED AND MOTORLESS FLIGHT, PART 1**

P. W. HANSON, comp. 1979 299 p refs Conf. held at Hampton, Va., 29-30 Mar. 1979; cosponsored by NASA and the Soaring Soc. of America

(NASA-CP-2085-PT-1; L-12973) Avail: NTIS HC A13/MF A01 CSCL 02A

CONFERENCES, FREE FLIGHT, GLIDING, LOW SPEED, SOARING, TECHNOLOGY ASSESSMENT

**N79-27070\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SCIENCE AND TECHNOLOGY OF LOW SPEED AND MOTORLESS FLIGHT. THIRD INTERNATIONAL SYMPOSIUM**

P. W. HANSON, comp. Jun. 1979 297 p refs Symp. held at Hampton, Va., 29-30 Mar. 1979; sponsored by NASA-Langley and Soaring Soc. of Am.

(L-12973; NASA-CP-2085-PT-2) Avail: NTIS HC A13/MF A01 CSCL 02A

AERODYNAMICS, AIRSPEED, CONFERENCES, FLIGHT CONTROL, GLIDERS, LOW SPEED

**N79-30139\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### **PERFORMANCE EVALUATION METHOD FOR DISSIMILAR AIRCRAFT DESIGNS**

H. J. WALKER Sep. 1979 72 p refs  
(NASA-RP-1042; H-1064) Avail: NTIS HC A04/MF A01 CSCL 02A

A rationale is presented for using the square of the wingspan rather than the wing reference area as a basis for nondimensional comparisons of the aerodynamic and performance characteristics of aircraft that differ substantially in planform and loading. Working relationships are developed and illustrated through application to several categories of aircraft covering a range of Mach numbers from 0.60 to 2.00. For each application, direct comparisons of drag polars, lift-to-drag ratios, and maneuverability are shown for both nondimensional systems. The inaccuracies that may arise in the determination of aerodynamic efficiency based on reference area are noted. Span loading is introduced independently in

comparing the combined effects of loading and aerodynamic efficiency on overall performance. Performance comparisons are made for the NACA research aircraft, lifting bodies, century-series fighter aircraft, F-111A aircraft with conventional and supercritical wings, and a group of supersonic aircraft including the B-58 and XB-70 bomber aircraft. An idealized configuration is included in each category to serve as a standard for comparing overall efficiency. Author

**N80-11028\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EVALUATION OF A WIND-TUNNEL GUST RESPONSE TECHNIQUE INCLUDING CORRELATIONS WITH ANALYTICAL AND FLIGHT TEST RESULTS**

L. T. REDD, P. W. HANSON, and E. C. WYNNE Nov. 1979 55 p refs

(NASA-TP-1501; L-13137) Avail: NTIS HC A04/MF A01 CSCL 01A

ATMOSPHERIC TURBULENCE, FLIGHT TESTS, GUST LOADS, WIND TUNNEL TESTS

**N80-15028\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### **LANDING APPROACH AIRFRAME NOISE MEASUREMENTS AND ANALYSIS**

P. L. LASAGNA, K. G. MACKALL, F. W. BURCHAM, JR., and T. W. PUTNAM Jan. 1980 36 p refs

(NASA-TP-1602) Avail: NTIS HC A03/MF A01 CSCL 20A

AIRCRAFT LANDING, AIRCRAFT NOISE, AIRFRAMES, NOISE MEASUREMENT

**N80-19022\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **ANALYSIS OF FUEL-CONSERVATIVE CURVED DECELERATING APPROACH TRAJECTORIES FOR POWERED-LIFT AND CTOL JET AIRCRAFT**

F. NEUMAN Apr. 1980 38 p refs

(NASA-TP-1650; A-7986) Avail: NTIS HC A03/MF A01 CSCL 02A

APPROACH, DESCENT TRAJECTORIES, FUEL CONSUMPTION, POWERED LIFT AIRCRAFT, TRAJECTORY ANALYSIS

**N80-29244\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **CONTROL-SYSTEM TECHNIQUES FOR IMPROVED DEPARTURE/SPIN RESISTANCE FOR FIGHTER AIRCRAFT**

L. T. NGUYEN, W. P. GILBERT, and M. E. OGBURN Aug. 1980 69 p refs

(NASA-TP-1689; L-13453) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT CONTROL, CONTROL THEORY, FIGHTER AIRCRAFT, SYSTEMS ENGINEERING

**N80-29245\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SUBSONIC AIRCRAFT: EVOLUTION AND THE MATCHING OF SIZE TO PERFORMANCE**

L. K. LOFTIN, JR. Aug. 1980 445 p refs

(NASA-RP-1060; L-13367) Avail: NTIS HC A19/MF A01 CSCL 01B

Methods for estimating the approximate size, weight, and power of aircraft intended to meet specified performance requirements are presented for both jet-powered and propeller-driven aircraft. The methods are simple and require only the use of a pocket computer for rapid application to specific sizing problems. Application of the methods is illustrated by means of sizing studies of a series of jet-powered and propeller-driven aircraft with varying design constraints. Some aspects of the technical evolution of the airplane from 1918 to the present are also briefly discussed. Author

**N81-13915\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A STUDY OF THE SONIC-BOOM CHARACTERISTICS OF A BLUNT BODY AT A MACH NUMBER OF 6**

G. C. ASHBY, JR. Dec. 1980 34 p refs  
(NASA-TP-1787; L-14017) Avail: NTIS HC A03/MF A01  
CSCL 01B

BLUNT BODIES, FINITE DIFFERENCE THEORY, MACH NUMBER, SIGNATURE ANALYSIS, SONIC BOOMS, STATIC PRESSURE

**N81-14961\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DETERMINATION OF THE HYPERSONIC-CONTINUUM/RAREFIED-FLOW DRAG COEFFICIENT OF THE VIKING LANDER CAPSULE 1 AEROSHELL FROM FLIGHT DATA**

R. C. BLANCHARD and G. D. WALBERG Dec. 1980 60 p refs  
(NASA-TP-1793; L-14042) Avail: NTIS HC A04/MF A01  
CSCL 01B

AERODYNAMIC COEFFICIENTS, AERODYNAMIC DRAG, ATMOSPHERIC ENTRY, CONTINUUM FLOW, HYPERSONIC FLOW, SPACECRAFT INSTRUMENTS, TEMPERATURE PROFILES, VIKING LANDER 1

**N81-15969\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE HIGH-SPEED FRONTIER. CASE HISTORIES OF FOUR NACA PROGRAMS, 1920 - 1950**

J. V. BECKER 1980 196 p refs  
(NASA-SP-445; LC-80-607935) Avail: NTIS MF A01; SOD HC \$6.50 CSCL 01B

The case histories focus on the fields of supersonic flow and aircraft design. The development of supersonic airfoils is described along with the development of test facilities such as transonic wind tunnels and slotted wind tunnels. Emphasis is placed on propeller blade design and configurations. The history of supersonic flow theory is presented. For individual titles, see N81-15970 through N81-15973.

**N81-17981\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SUPERSONIC CRUISE RESEARCH 1979, PART 1**

Mar. 1980 542 p refs Conf. held at Hampton, Va., 13-16 Nov. 2 Vol.  
(NASA-CP-2108-PT-1; L-13385-PT-1) Avail: NTIS HC A23/MF A01 CSCL 01A

AERODYNAMICS, AIRCRAFT DESIGN, CONFERENCES, SUPERSONIC CRUISE AIRCRAFT RESEARCH

**N81-18005\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SUPERSONIC CRUISE RESEARCH 1979, PART 2**

Mar. 1980 407 p refs Conf. held at Hampton, Va., 13-16 Nov. 1979  
(NASA-CP-2108-PT-2; L-13385-PT-2) Avail: NTIS HC A18/MF A01 CSCL 01A

AIRCRAFT STRUCTURES, AIRFRAME MATERIALS, CONFERENCES, ECONOMIC ANALYSIS, SUPERSONIC CRUISE AIRCRAFT RESEARCH, SYSTEMS INTEGRATION

**N81-19001\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ADVANCED AERODYNAMICS AND ACTIVE CONTROLS. SELECTED NASA RESEARCH**

Feb. 1981 180 p refs Presented at the 4th Ann. Status Rev. of the NASA Aircraft Energy Efficiency (ACEE) Energy Efficient Transport Program, Mountain View, Calif. 7-9 Oct. 1980  
(NASA-CP-2172; L-14278) Avail: NTIS HC A09/MF A01  
CSCL 01B

ACTIVE CONTROL, AIRCRAFT DESIGN, CONFERENCES, DRONE AIRCRAFT, FLIGHT CHARACTERISTICS, FLIGHT TESTS,

FLY BY WIRE CONTROL, LIGHTNING, SUPERCRITICAL WINGS, TRANSPORT AIRCRAFT, WINGLETS

**N81-21999\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**JOINT UNIVERSITY PROGRAM FOR AIR TRANSPORTATION RESEARCH, 1980**

Mar. 1981 139 p refs Proceedings of Conf. held at Hampton, Va., 11-12 Dec. 1980  
(NASA-CP-2176) Avail: NTIS HC A07/MF A01 CSCL 01B  
AIR TRANSPORTATION, CONFERENCES, LORAN C, NAVIGATION AIDS

**N82-11013\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF VORTEX FLAPS ON THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF AN ARROW WING**

L. P. YIP and D. G. MURRI Nov. 1981 64 p refs  
(NASA-TP-1914; L-14575) Avail: NTIS HC A04/MF A01  
CSCL 01B

AERODYNAMIC CHARACTERISTICS, ARROW WINGS, FLOW VISUALIZATION, LOW SPEED STABILITY, VORTEX FLAPS, WIND TUNNEL TESTS

**N82-14049\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**OPTIMIZATION AND PERFORMANCE CALCULATION OF DUAL-ROTATION PROPELLERS**

R. E. DAVIDSON Dec. 1981 48 p refs  
(NASA-TP-1948; L-14678) Avail: NTIS HC A03/MF A01  
CSCL 01A

AERODYNAMIC DRAG, AIRFOIL PROFILES, DUAL WING CONFIGURATIONS, PROPELLER BLADES, THEODORSEN TRANSFORMATION, WING TIPS

**N82-19134\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ELECTRIC FLIGHT SYSTEMS**

N. J. GROOM, ed. and R. V. HOOD, ed. Feb. 1982 269 p  
Proceedings of workshop held in Hampton, Va., 9-10 Jun. 1981  
(NASA-CP-2209; L-14965) Avail: NTIS HC A12/MF A01  
CSCL 01C

AIRCRAFT DESIGN, AIRCRAFT ENGINES, AUXILIARY POWER SOURCES, ELECTRIC GENERATORS, ELECTRIC MOTORS, ENVIRONMENTAL CONTROL, FLIGHT CONTROL, SPACECRAFT PROPULSION

**N82-21139\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**PROCEEDINGS: FIFTH ANNUAL WORKSHOP ON METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS**

D. W. CAMP, ed., W. FROST, ed. (Tennessee Univ. Space Inst.), and P. D. PARSLEY, ed. Dec. 1981 149 p refs Workshop held at Tullahoma, Tenn., 30 Mar. - 1 Apr. 1981; sponsored by NASA, NOAA and FAA  
(NAS8-32692)

(NASA-CP-2192; NAS 1.55:2192; FAA-RD-81-67) Avail: NTIS HC A07/MF A01 CSCL 01B

AERONAUTICS, AIR TRAFFIC CONTROL, ATMOSPHERIC EFFECTS, FLIGHT SAFETY, METEOROLOGICAL SERVICES, METEOROLOGY, WEATHER

**N82-26199\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**JOINT UNIVERSITY PROGRAM FOR AIR TRANSPORTATION RESEARCH, 1981**

Jun. 1982 235 p refs Proc. of a Conf. held at Washington, D.C., 11 Dec. 1981  
(NGL-22-009-640; NGR-36-009-017; NGL-31-001-252)  
(NASA-CP-2224; L-15346; NAS 1.55:2224) Avail: NTIS HC A11/MF A01 CSCL 01B

AIR NAVIGATION, AUTOMATIC GAIN CONTROL, DEICERS,

## 01 AERONAUTICS (GENERAL)

INTERPROCESSOR COMMUNICATION, LORAN C,  
MICROPROCESSORS

**N82-26217\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**EFFECTS OF WING-LEADING-EDGE MODIFICATIONS ON A FULL-SCALE, LOW-WING GENERAL AVIATION AIRPLANE: WIND-TUNNEL INVESTIGATION OF HIGH-ANGLE-OF-ATTACK AERODYNAMIC CHARACTERISTICS**

W. A. NEWSOM, JR., D. R. SATRAN, and J. L. JOHNSON, JR.  
Jun. 1982 107 p refs  
(NASA-TP-2011; L-15101; NAS 1.60:2011) Avail: NTIS HC  
A06/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AERODYNAMIC  
STALLING, ANGLE OF ATTACK, GENERAL AVIATION  
AIRCRAFT, LEADING EDGES, WIND TUNNEL TESTS

**N82-31294\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**NOISE AND ECONOMIC CHARACTERISTICS OF AN ADVANCED BLENDED SUPERSONIC TRANSPORT CONCEPT**

J. K. MOLLOY, W. D. GRANTHAM, and M. J. NEUBAUER, JR.  
Sep. 1982 32 p refs  
(NASA-TP-2073; L-15297; NAS 1.60:2073) Avail: NTIS HC  
A03/MF A01 CSCL 01B

ECONOMIC FACTORS, NOISE PREDICTION (AIRCRAFT),  
SUPERSONIC AIRCRAFT

**N83-33827\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**PROCEEDINGS: SIXTH ANNUAL WORKSHOP ON METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS**

W. FROST, ed., D. W. CAMP, ed., and L. W. HERSHMAN, ed.  
Apr. 1983 140 p refs Workshop held in Tullahoma, Tenn.,  
26-28 Oct. 1982; sponsored in cooperation with NOAA and FAA  
Prepared in cooperation with Tennessee Univ. Space Inst.,  
Tullahoma Original contains color illustrations  
(NAS8-34627)

(NASA-CP-2274; NAS 1.55:2274; FAA-RD-82-72; AD-A133965)

Avail: NTIS HC A07/MF A01 CSCL 01A

AIR TRAFFIC CONTROL, FLIGHT SAFETY,  
METEOROLOGICAL PARAMETERS, SAFETY FACTORS

**N84-11099\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**JOINT UNIVERSITY PROGRAM FOR AIR TRANSPORTATION RESEARCH, 1982**

Washington Oct. 1983 147 p refs Conf. held in Hampton,  
Va., 10 Dec. 1982

(NASA-CP-2285; L-15688; NAS 1.55:2285) Avail: NTIS HC

A07/MF A01 CSCL 01B

CONFERENCES, DISTRIBUTED PROCESSING, LORAN C,  
MICROCOMPUTERS, RESEARCH AND DEVELOPMENT

**N84-12029\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**CONTROLS, DISPLAYS, AND INFORMATION TRANSFER FOR GENERAL AVIATION IFR OPERATIONS**

H. P. BERGERON, ed. and J. D. SHAUGHNESSY, ed.  
Washington Oct. 1983 272 p refs Workshop held in  
Hampton, Va., 30-31 Aug. 1982

(NASA-CP-2279; L-15649; NAS 1.55:2279) Avail: NTIS HC

A12/MF A01 CSCL 01B

ACCIDENT INVESTIGATION, AIRCRAFT ACCIDENTS,  
CONFERENCES, CONTROL THEORY, DISPLAY DEVICES,  
FLIGHT CONTROL, INSTRUMENT FLIGHT RULES, PILOT  
TRAINING, PILOTLESS AIRCRAFT, SAFETY

**N84-27660\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**ADVANCED AERODYNAMICS. SELECTED NASA RESEARCH**  
Washington Dec. 1981 97 p refs Presented at the 5th Ann.  
Status Rev. of the NASA Aircraft Energy Efficiency (ACEE) Energy  
Efficient Transport Prog., Edwards, Calif., 14-15 Sep. 1981

(NASA-CP-2208; L-14949; NAS 1.55:2208) Avail: NTIS HC

A05/MF A01 CSCL 01B

ACEE PROGRAM, AERODYNAMICS, AIRFOILS,  
CONFERENCES, DESIGN ANALYSIS, PROPELLERS

**N85-17934\*#** National Aeronautics and Space Administration.  
Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**ON THE FRONTIER: FLIGHT RESEARCH AT DRYDEN 1946-1981**

R. P. HALLION 1984 394 p refs

(NASA-SP-4303; NAS 1.21:4303; LC-83-14136) Avail: NTIS MF  
A01; SOD HC \$15.00 as SN-033-000-00893-7 CSCL 01B

The history of flight research at the NASA Hugh L. Dryden  
Flight Research Center is recounted. The period of emerging  
supersonic flight technology (1944 to 1959) is reviewed along with  
the era of flight outside the Earth's atmosphere (1959 to 1981).  
Specific projects such as the X-15, Gemini, Apollo, and the space  
shuttle are addressed. The flight chronologies of various aircraft  
and spacecraft are given. R.S.F.

**N85-23683\*#** National Aeronautics and Space Administration,  
Washington, D.C.

**MODEL RESEARCH: THE NATIONAL ADVISORY COMMITTEE  
FOR AERONAUTICS, 1915-1958, VOLUME 1**

A. ROLAND 1984 432 p refs 2 Vol.

(NASA-SP-4103-VOL-1; NAS 1.21:4103-VOL-1) Avail: NTIS HC  
A19/MF A01; also available from SOD HC \$26.00 as set of 2

CSCL 01B

The National Advisory Committee for Aeronautics, the  
predecessor of NASA, was the premier aeronautical research  
organization in the United States. It conducted scientific study of  
the problems of flight with a view to their practical solution. This  
institutional history traces the birth and evolution of the NACA  
and analyzes such recurrent themes as the roles of science and  
engineering, the influence of politics on technology, the way in  
which the institution shapes technology and technology shapes  
the institution, the contributions of key individuals, the nature of  
the research process, and the relation between military and civilian  
aviation. Author

**N85-23684\*#** National Aeronautics and Space Administration,  
Washington, D.C.

**MODEL RESEARCH, THE NATIONAL ADVISORY COMMITTEE  
FOR AERONAUTICS, 1915-1958, VOLUME 2**

A. ROLAND 1985 414 p refs 2 Vol.

(NASA-SP-4103-VOL-2; NAS 1.21:4103-VOL-2) Avail: NTIS HC  
A18/MF A01; also available from SOD HC \$26.00 as set of 2

CSCL 01B

Appendices providing comprehensive data on personnel,  
organization, funding, research programs, and publications of the  
National Advisory Committee for Aeronautics (NACA) are  
presented. Information concerning NACA-related legislation and  
research facilities is also included. M.G.

**N85-28912\*#** McLean (F. Edward), Yorktown, Va.

**SUPERSONIC CRUISE TECHNOLOGY**

F. E. MCLEAN Feb. 1985 194 p refs Original contains  
color illustrations

(NASW-3531)

(NASA-SP-472; NAS 1.21:472; LC-83-26912) Avail: NTIS HC

A09/MF A01; SOD HC \$6.50 as 033-000-00944-5 CSCL 01B

The history and status of supersonic cruise research is covered.  
The early research efforts of the National Advisory Committee for  
Aeronautics and efforts during the B-70 and SST phase are  
included. Technological progress made during the NASA  
Supersonic Cruise Research and Variable Cycle Engine programs  
are presented. While emphasis is on NASA's contributions to



supersonic cruise research in the U.S., also noted are developments in England, France, and Russia. Written in nontechnical language, this book presents the most critical technology issues and research findings. Author

**N85-32089\*#** Loftin (Laurence K., Jr.), Newport News, Va.  
**QUEST FOR PERFORMANCE: THE EVOLUTION OF MODERN AIRCRAFT**

L. K. LOFTIN, JR. 1985 548 p refs Original contains color illustrations (NASW-3490)  
 (NASA-SP-468; NAS 1.21:468) Avail: NTIS HC A23/MF A01; SOD HC \$26.00 as 033-000-00902-0 CSCL 01B

The technical evolution of the subsonic airplane is traced from a curiosity at the beginning of World War I to the highly useful machine of today. Included are descriptions of significant aircraft which incorporated important technical innovations and served to shape the future course of aeronautical development, as well as aircraft which represented the state-of-art in a particular time frame or were much used or liked. The discussion is related primarily to aircraft configuration evolution and associated aerodynamic characteristics and, to a lesser extent, to developments in aircraft construction and propulsion. The material is presented in a manner designed to appeal to the nontechnical reader who is interested in the evolution of the airplane, as well as to students of aeronautical engineering and others with an aeronautical background. Author

**N86-16187\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VORTEX WAKE ALLEVIATION STUDIES WITH A VARIABLE TWIST WING**

G. T. HOLBROOK, D. M. DUNHAM, and G. C. GREENE Nov. 1985 117 p refs  
 (NASA-TP-2442; L-15870; NAS 1.60:2442) Avail: NTIS HC A06/MF A01 CSCL 01B

AIRCRAFT WAKES, AIRFOILS, CONTROL SURFACES, SLIPSTREAMS, SPOILERS, TRAILING EDGES, TWISTED WINGS, VARIABLE GEOMETRY STRUCTURES, VORTEX ALLEVIATION, VORTICES, WIND TUNNEL TESTS, WING FLAPS, WING SPAN

**N86-23552\*** National Aeronautics and Space Administration, Washington, D.C.

**A CUMULATIVE INDEX TO A CONTINUING BIBLIOGRAPHY ON AERONAUTICAL ENGINEERING**

1986 521 p  
 (NASA-SP-7037(196); NAS 1.21:7037(196)) Avail: NTIS HC A22 CSCL 01A

This bibliography is a cumulative index to the abstracts contained in NASA-SP-7037(184) through NASA-SP-7037(195) of Aeronautical Engineering: A Continuing Bibliography. NASA SP-7037 and its supplements have been compiled through the cooperative efforts of the American Institute of Aeronautics and Astronautics (AIAA) and the National Aeronautics and Space Administration (NASA). This cumulative index includes subject, personal author, corporate source, foreign technology, contract, report number, and accession number indexes. Author

**N86-29762\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MOTION AND INTERACTION OF DECAYING TRAILING VORTICES IN SPANWISE SHEAR WIND**

C. H. LIU and T. LU (New York Univ., New York.) Sep. 1986 26 p  
 (NASA-TP-2599; L-16040; NAS 1.60:2599) Avail: NTIS HC A03/MF A01 CSCL 01B

SHEAR FLOW, TRAILING EDGES, VORTICES, WAKES

**N86-32389\*** National Aeronautics and Space Administration, Washington D.C.

**AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 204)**

Sep. 1986 122 p  
 (NASA-SP-7037(204); NAS 1.21:7037(204)) Avail: NTIS HC A06 CSCL 01A

This bibliography lists 419 reports, articles, and other documents introduced into the NASA scientific and technical information system in August 1986. Author

## 02

## AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

**N77-30089\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COLD AIR PERFORMANCE OF A 12.766-CENTIMETER-TIP-DIAMETER AXIAL-FLOW COOLED TURBINE. 2: EFFECT OF AIR EJECTION ON TURBINE PERFORMANCE**

J. E. HAAS and M. G. KOFSEY Aug. 1977 37 p refs  
 Prepared in cooperation with Army Air Mobility Res. and Develop. Lab., Cleveland  
 (NASA-TP-1018) Avail: NTIS HC A03/MF A01 CSCL 21E  
 AIR COOLING, AXIAL FLOW TURBINES, PERFORMANCE

**N77-32082\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COLD-AIR PERFORMANCE OF A 12.766-CENTIMETER-TIP-DIAMETER AXIAL-FLOW COOLED TURBINE. 3: EFFECT OF ROTOR TIP CLEARANCE ON OVERALL PERFORMANCE OF A SOLID BLADE CONFIGURATION**

J. E. HAAS (Army Air Mobility Research and Development Lab., Cleveland, Ohio) and M. G. KOFSEY Sep. 1977 24 p refs  
 (NASA-TP-1032; E-9181) Avail: NTIS HC A02/MF A01 CSCL 01A

AXIAL FLOW TURBINES, BLADE TIPS, CLEARANCES, COMPRESSOR EFFICIENCY

**N77-33111\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SPIN-TUNNEL INVESTIGATION OF THE SPINNING CHARACTERISTICS OF TYPICAL SINGLE-ENGINE GENERAL AVIATION AIRPLANE DESIGNS. 1. LOW-WING MODEL A: EFFECTS OF TAIL CONFIGURATIONS**

S. M. BURK, JR., J. S. BOWMAN, JR., and W. L. WHITE Sep. 1977 92 p refs  
 (NASA-TP-1009; L-11227) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, AIRCRAFT DESIGN, LOW WING AIRCRAFT, SPIN TESTS, TAIL ASSEMBLIES

**N77-33112\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORETICAL PARAMETRIC STUDY OF THE RELATIVE ADVANTAGES OF WINGLETS AND WING-TIP EXTENSIONS**

H. H. HEYSON, G. D. RIEBE, and C. L. FULTON Sep. 1977 75 p refs  
 (NASA-TP-1020; L-11679) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, EXTENSIONS, WING TIPS, WINGLETS

## 02 AERODYNAMICS

**N77-85474\*** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.  
**SUPERCritical WING TECHNOLOGY: A REPORT ON FLIGHT EVALUATIONS**  
1972 133 p  
(NASA-SP-301; C72-71337)

**N78-10030\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EFFECT OF A SIMULATED ENGINE JET BLOWING ABOVE AN ARROW WING AT MACH 2.0**  
B. L. SHROUT and C. HAYES 1977 56 p refs  
(NASA-TP-1050; L-11751) Avail: NTIS HC A04/MF A01  
CSCL 01A  
ARROW WINGS, EXHAUST FLOW SIMULATION, JET EXHAUST

**N78-11002\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EXPERIMENTAL PERFORMANCE OF A 13.65-CENTIMETER-TIP-DIAMETER TANDEM-BLADED SWEEPBACK CENTRIFUGAL COMPRESSOR DESIGNED FOR A PRESSURE RATIO OF 6**  
H. A. KLASSEN, J. R. WOOD (Army Air Mobility Res. and Develop. Lab., Cleveland), and L. F. SCHUMANN (Army Air Mobility Res. and Develop. Lab., Cleveland) Nov. 1977 27 p refs  
(NASA-TP-1091) Avail: NTIS HC A03/MF A01 CSCL 01A  
CENTRIFUGAL COMPRESSORS, GAS TURBINE ENGINES, PERFORMANCE TESTS, PRESSURE MEASUREMENT

**N78-11007\*#** National Aeronautics and Space Administration, Washington, D.C.  
**A SURVEY OF COMPUTATIONAL AERODYNAMICS IN THE UNITED STATES**

A. GESSOW and D. J. MORRIS 1977 49 p refs  
(NASA-SP-394) Avail: NTIS HC A03/MF A01 CSCL 01A

Programs in theoretical and computational aerodynamics in the United States are described. Those aspects of programs that relate to aeronautics are detailed. The role of analysis at various levels of sophistication is discussed as well as the inverse solution techniques that are of primary importance in design methodology. The research is divided into the broad categories of application for boundary layer flow, Navier-Stokes turbulence modeling, internal flows, two-dimensional configurations, subsonic and supersonic aircraft, transonic aircraft, and the space shuttle. A survey of representative work in each area is presented. Author

**N78-11008\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EFFECT OF COOLANT FLOW EJECTION ON AERODYNAMIC PERFORMANCE OF LOW-ASPECT-RATIO VANES. 2: PERFORMANCE WITH COOLANT FLOW EJECTION AT TEMPERATURE RATIOS UP TO 2**  
J. E. HASS (Army Air Mobility Res. and Develop. Lab., Cleveland) and M. G. KOFSEY Oct. 1977 34 p refs  
(NASA-TP-1057; E-9213) Avail: NTIS HC A03/MF A01 CSCL 21E  
AERODYNAMIC CHARACTERISTICS, CASCADE FLOW, LIQUID COOLING, TEMPERATURE DISTRIBUTION, VANES

**N78-12017\*#** National Aeronautics and Space Administration, Washington, D.C.  
**WAKE VORTEX MINIMIZATION**  
1977 403 p Symp. held at Washington, 25-26 Feb. 1976  
(NASA-SP-409) Avail: NTIS HC A18/MF A01 CSCL 01A

A status report is presented on research directed at reducing the vortex disturbances of aircraft wakes. The objective of such a reduction is to minimize the hazard to smaller aircraft that might encounter these wakes. Inviscid modeling was used to study trailing vortices and viscous effects were investigated. Laser velocimeters were utilized in the measurement of aircraft wakes. Flight and wind tunnel tests were performed on scale and full model scale aircraft of various design. Parameters investigated included the

effect of wing span, wing flaps, spoilers, splines and engine thrust on vortex attenuation. Results indicate that vortices may be alleviated through aerodynamic means. For individual titles, see N78-12018 through N78-12028.

**N78-12038\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AERODYNAMIC CHARACTERISTICS AT MACH NUMBERS FROM 0.33 TO 1.20 OF A WING-BODY DESIGN CONCEPT FOR A HYPERSONIC RESEARCH AIRPLANE**  
J. L. DILLON and J. L. PITTMAN Dec. 1977 76 p refs  
(NASA-TP-1044; L-11723) Avail: NTIS HC A05/MF A01  
CSCL 01A  
AERODYNAMIC CHARACTERISTICS, HYPERSONIC AIRCRAFT, MACH NUMBER, STRUCTURAL DESIGN, TRANSONIC WIND TUNNELS

**N78-12039\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AN EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF PROPRITOR WHIRL FLUTTER**  
R. G. KVATERNIK and J. S. KOHN (Grumman Aerospace Corp., Bethpage, N. Y.) Dec. 1977 76 p refs  
(NASA-TP-1047; L-11656) Avail: NTIS HC A05/MF A01  
CSCL 01A  
FLUTTER, PROPELLER BLADES, ROTATION

**N78-12040\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SPIN-TUNNEL INVESTIGATION OF THE SPINNING CHARACTERISTICS OF TYPICAL SINGLE-ENGINE GENERAL AVIATION AIRPLANE DESIGNS. 2: LOW-WING MODEL A; TAIL PARACHUTE DIAMETER AND CANOPY DISTANCE FOR EMERGENCY SPIN RECOVERY**  
S. M. BURK, JR., J. S. BOWMAN, JR., and W. L. WHITE Washington Nov. 1977 30 p refs  
(NASA-TP-1076; L-11804) Avail: NTIS HC A03/MF A01  
CSCL 01A  
LIGHT AIRCRAFT, RECOVERY PARACHUTES, SPIN STABILIZATION, TAIL ASSEMBLIES

**N78-12041\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SUPERSONIC AERODYNAMIC CHARACTERISTICS OF A SPARROW 3 TYPE MISSILE MODEL WITH WING CONTROLS AND COMPARISON WITH EXISTING TAIL-CONTROL RESULTS**  
W. J. MONTA Nov. 1977 84 p refs  
(NASA-TP-1078; L-11715) Avail: NTIS HC A05/MF A01  
CSCL 01A  
AERODYNAMIC CHARACTERISTICS, SPARROW 3 MISSILE, SUPERSONIC FLIGHT, TAIL ASSEMBLIES, WINGS

**N78-13014\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EFFECTS OF DEFLECTED THRUST ON THE LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A CLOSE-COUPLED WING-CANARD CONFIGURATION**  
L. P. YIP and J. W. PAULSON, JR. Dec. 1977 88 p refs  
(NASA-TP-1090; L-11886) Avail: NTIS HC A05/MF A01  
CSCL 01A  
CANARD CONFIGURATIONS, DEFLECTION, LONGITUDINAL STABILITY, THRUST, WIND TUNNEL TESTS

**N78-13016\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF ROUGHNESS SIZE ON THE POSITION OF BOUNDARY-LAYER TRANSITION AND ON THE AERODYNAMIC CHARACTERISTICS OF A 55 DEG. SWEEPED DELTA WING AT SUPERSONIC SPEEDS**

R. L. STALLINGS, JR. and M. LAMB Dec. 1977 49 p refs (NASA-TP-1027; L-11496) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, BOUNDARY LAYER TRANSITION, DELTA WINGS, ROUGHNESS, SUPERSONIC SPEED

**N78-13017\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPUTATION OF TRANSONIC BOATTAIL FLOW WITH SEPARATION**

R. G. WILMOTH Dec. 1977 65 p refs (NASA-TP-1070; L-11669) Avail: NTIS HC A04/MF A01 CSCL 01A

BOATTAILS, COMPUTATION, ITERATION, SEPARATED FLOW, TRANSONIC FLOW

**N78-14997\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**IMPROVEMENT OF MANEUVER AERODYNAMICS BY SPANWISE BLOWING**

G. E. ERICKSON (George Washington Univ.) and J. F. CAMPBELL Dec. 1977 68 p refs (NASA-TP-1065; L-11642) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC STABILITY, AIRCRAFT MANEUVERS, FIGHTER AIRCRAFT, SPANWISE BLOWING, WIND TUNNEL MODELS

**N78-14998\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COLD-AIR PERFORMANCE OF A TIP TURBINE DESIGNED TO DRIVE A LIFT FAN**

J. E. HAAS, M. G. KOFSKEY, and G. M. HOTZ Jan. 1978 23 p refs (NASA-TP-1126; E-9293) Avail: NTIS HC A02/MF A01 CSCL 20E

LIFT FANS, TURBINES, V/STOL AIRCRAFT

**N78-16000\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LONGITUDINAL AERODYNAMIC CHARACTERISTICS AT MACH 0.60 TO 2.86 OF A FIGHTER CONFIGURATION WITH STRUT BRACED WING**

S. M. DOLLYHIGH, W. J. MONTA, and G. SANGIORGIO Dec. 1977 149 p refs (NASA-TP-1102; L-11801) Avail: NTIS HC A07/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, FIGHTER AIRCRAFT, LONGITUDINAL STABILITY, STRUTS, WINGS

**N78-16001\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COLD-AIR PERFORMANCE OF A TIP TURBINE DESIGNED TO DRIVE A LIFT FAN. 3: EFFECT OF SIMULATED FAN LEAKAGE ON TURBINE PERFORMANCE**

J. E. HAAS (Army R and T Labs.), M. G. KOFSKEY, G. M. HOTZ, and S. M. FUTRAL, JR. Jan. 1978 28 p refs (NASA-TP-1109; E-9331) Avail: NTIS HC A03/MF A01 CSCL 01A

ENGINE DESIGN, LIFT FANS, PERFORMANCE TESTS, TIP DRIVEN ROTORS, TURBINE ENGINES

**N78-17000\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**DYNAMIC STALL EXPERIMENTS ON THE NACA 0012 AIRFOIL**

K. W. MCALISTER, L. W. CARR, and W. J. MCCROSKEY Jan. 1978 166 p refs (NASA-TP-1100; A-7096) Avail: NTIS HC A08/MF A01 CSCL 01A

AERODYNAMIC LOADS, AERODYNAMIC STALLING, AIRFOILS, DYNAMIC RESPONSE

**N78-17997\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**EFFECT OF WINGLETS ON A FIRST-GENERATION JET TRANSPORT WING. 4: STABILITY CHARACTERISTICS FOR A FULL-SPAN MODEL AT MACH 0.30**

R. R. MEYER, JR. Feb. 1978 74 p refs (NASA-TP-1119; L-11705) Avail: NTIS HC A04/MF A01 CSCL 01A

AIRCRAFT LANDING, AIRCRAFT STABILITY, SCALE MODELS, TRANSPORT AIRCRAFT, WINGLETS, WINGS

**N78-17998\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF DESIGN CHANGES ON AERODYNAMIC AND ACOUSTIC PERFORMANCE OF TRANSLATING-CENTERBODY SONIC INLETS**

B. A. MILLER Feb. 1978 49 p refs (NASA-TP-1132; E-9283) Avail: NTIS HC A03/MF A01 CSCL 01A

ACOUSTIC PROPERTIES, AERODYNAMIC CONFIGURATIONS, INLET FLOW, SCALE MODELS

**N78-17999\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**TWO-DIMENSIONAL TRANSONIC TESTING WITH SPLITTER PLATES**

S. DAVIS and B. SATYANARAYANA Feb. 1978 24 p refs (NASA-TP-1153; A-7221) Avail: NTIS HC A02/MF A01 CSCL 01A

FLAT PLATES, STATIC PRESSURE, TRANSONIC FLOW, TRANSONIC WIND TUNNELS, WIND TUNNEL TESTS

**N78-20078\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMPLIFIED SONIC-BOOM PREDICTION**

H. W. CARLSON Mar. 1978 50 p refs (NASA-TP-1122; L-11794) Avail: NTIS HC A03/MF A01 CSCL 20A

AERODYNAMIC CONFIGURATIONS, CALCULATORS, CHARTS, PREDICTION ANALYSIS TECHNIQUES, SONIC BOOMS

**N78-20079\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 1.90 TO 2.86 OF A CANARD-CONTROLLED MISSILE WITH RAM-AIR-JET SPOILER ROLL CONTROL**

A. B. BLAIR, JR. Mar. 1978 104 p refs (NASA-TP-1124; L-11873) Avail: NTIS HC A06/MF A01 CSCL 01A

CANARD CONFIGURATIONS, LATERAL CONTROL, MISSILE CONFIGURATIONS, SPOILERS, SUPERSONIC FLOW, WIND TUNNEL TESTS

## 02 AERODYNAMICS

**N78-20080\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF COOLING-HOLE GEOMETRY ON AERODYNAMIC PERFORMANCE OF A FILM-COOLED TURBINE VANE TESTED WITH COLD AIR IN A TWO-DIMENSIONAL CASCADE**

J. F. KLINE, R. G. STABE, and T. P. MOFFITT Mar. 1978 49 p refs

(NASA-TP-1136; E-9174) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, CASCADE WIND TUNNELS, COOLING SYSTEMS, FILM COOLING, HOLE DISTRIBUTION (MECHANICS), TURBINE BLADES, VANES

**N78-20081\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF WINGLETS ON A FIRST-GENERATION JET TRANSPORT WING. 5: STABILITY CHARACTERISTICS OF A FULL-SPAN WING WITH A GENERALIZED FUSELAGE AT HIGH SUBSONIC SPEEDS**

P. F. JACOBS Mar. 1978 71 p refs  
(NASA-TP-1163; L-11982) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AERODYNAMIC STABILITY, JET AIRCRAFT, SUBSONIC SPEED, WING SPAN, WINGLETS

**N78-21055\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NUMERICAL STUDY OF TRANSONIC FLOW OVER OSCILLATING AIRFOILS USING THE FULL POTENTIAL EQUATION**

K. ISOGAI Apr. 1978 41 p refs  
(NASA-TP-1120; L-11984) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMICS, AIRFOILS, FINITE DIFFERENCE THEORY, TRANSONIC FLOW

**N78-22028\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF STORES ON LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A FIGHTER AT SUPERSONIC SPEEDS**

S. M. DOLLYHIGH, G. SANGIORGIO, and W. J. MONTA Apr. 1978 46 p refs  
(NASA-TP-1175; L-11874) Avail: NTIS HC A03/MF A01 CSCL 10C

AERODYNAMIC CHARACTERISTICS, EXTERNAL STORES, F-16 AIRCRAFT, LONGITUDINAL STABILITY, SUPERSONIC SPEED

**N78-23056\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**FLIGHT-MEASURED BUFFET CHARACTERISTICS OF A SUPERCRITICAL WING AND A CONVENTIONAL WING ON A VARIABLE-SWEEP AIRPLANE**

R. C. MONAGHAN May 1978 39 p refs  
(NASA-TP-1244; H-991) Avail: NTIS HC A03/MF A01 CSCL 01A

BUFFETING, F-111 AIRCRAFT, SUPERCRITICAL WINGS, VARIABLE SWEEP WINGS

**N78-24046\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**POWERED-LIFT AERODYNAMICS AND ACOUSTICS**

Washington 1976 502 p refs Conf. held at Hampton, Va., 24-26, May 1976  
(NASA-SP-406) Avail: NTIS HC A22/MF A01 CSCL 01A

Powered lift technology is reviewed. Topics covered include: (1) high lift aerodynamics; (2) high speed and cruise aerodynamics; (3) acoustics; (4) propulsion aerodynamics and acoustics; (5) aerodynamic and acoustic loads; and (6) full-scale and flight research. For individual titles, see N78-24047 through N78-24076.

**N78-25058\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A DISTRIBUTED VORTEX METHOD FOR COMPUTING THE VORTEX FIELD OF A MISSILE**

R. L. BARGER Jun. 1978 19 p refs  
(NASA-TP-1183; L-11963) Avail: NTIS HC A02/MF A01 CSCL 01A

APPROXIMATION, FLOW DISTRIBUTION, MISSILE BODIES, VORTEX SHEETS

**N78-25059\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS AT MACH NUMBER 0.2 OF A WING-BODY CONCEPT FOR A HYPERSONIC RESEARCH AIRPLANE**

J. L. DILLON and T. R. CREEL, JR. Jun. 1978 48 p refs  
(NASA-TP-1189; L-12063) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, BODY-WING CONFIGURATIONS, HYPERSONIC AIRCRAFT, SUBSONIC SPEED

**N78-25060\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF SPANWISE NOZZLE GEOMETRY AND LOCATION ON THE LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A VECTORED-ENGINE-OVER-WING CONFIGURATION AT SUBSONIC SPEEDS**

L. D. LEAVITT and L. P. YIP May 1978 78 p refs  
(NASA-TP-1215; L-12015) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, SPANWISE BLOWING, THRUST VECTOR CONTROL, WIND TUNNEL MODELS

**N78-25061\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A WIND-TUNNEL STUDY OF THE APPLICABILITY OF FAR-FIELD SONIC-BOOM THEORY TO THE SPACE SHUTTLE ORBITER**

H. W. CARLSON and R. J. MACK Jun. 1978 48 p refs  
(NASA-TP-1186; L-12051) Avail: NTIS HC A03/MF A01 CSCL 01A

SCALE MODELS, SONIC BOOMS, SPACE SHUTTLE ORBITERS, WIND TUNNEL TESTS

**N78-26109\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF A NONAXISYMMETRIC WEDGE NOZZLE AT STATIC CONDITIONS**

G. T. CARSON, JR. and M. L. MASON Jul. 1978 45 p refs  
(NASA-TP-1188; L-12065) Avail: NTIS HC A03/MF A01 CSCL 01A

EXHAUST NOZZLES, PRESSURE MEASUREMENT, STATIC TESTS, WEDGE FLOW

**N78-28056\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN ANALYSIS OF THE GUST-INDUCED OVERSPEED TRENDS OF HELICOPTER ROTORS**

J. L. JENKINS, JR. and W. T. YEAGER, JR. (AVRADCOM Res. and Technol. Labs.) Jul. 1978 23 p refs  
(NASA-TP-1213; AVRADCOM-TR-78-24; L-12159) Avail: NTIS HC A02/MF A01 CSCL 01A

GUST LOADS, HELICOPTERS, HIGH SPEED, ROTARY WINGS

**N78-28057\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**STATIC PERFORMANCE OF FIVE TWIN-ENGINE NONAXISYMMETRIC NOZZLES WITH VECTORING AND REVERSING CAPABILITY**

F. J. CAPONE Jul. 1978 66 p refs  
 (NASA-TP-1224; L-12067) Avail: NTIS HC A04/MF A01  
 CSCL 01A

NOZZLE GEOMETRY, STATIC AERODYNAMIC CHARACTERISTICS, THRUST REVERSAL, THRUST VECTOR CONTROL

**N78-30052\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**BOUNDARY-LAYER SEPARATION ON ISOLATED BOATTAIL NOZZLES M.S. Thesis - George Washington Univ.**

W. K. ABEYOUNIS Aug. 1978 63 p refs  
 (NASA-TP-1226; L-12104) Avail: NTIS HC A04/MF A01  
 CSCL 10A

BOATTAILS, BOUNDARY LAYER SEPARATION, TRANSONIC NOZZLES

**N78-30053\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC AERODYNAMIC CHARACTERISTICS OF A WINGED SINGLE-STAGE-TO-ORBIT VEHICLE AT MACH NUMBERS FROM 0.3 TO 4.63**

D. C. FREEMAN, JR. and R. H. FOURNIER Aug. 1978 119 p refs  
 (NASA-TP-1233; L-12200) Avail: NTIS HC A06/MF A01  
 CSCL 01A

SINGLE STAGE TO ORBIT VEHICLES, STATIC AERODYNAMIC CHARACTERISTICS

**N78-30054\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPROXIMATE INDICIAL LIFT FUNCTION FOR TAPERED, SWEEP WINGS IN INCOMPRESSIBLE FLOW**

M. J. QUEIJO, W. R. WELLS (Wright State Univ., Dayton, Ohio), and D. A. KESKAR (Cincinnati Univ., Ohio) Aug. 1978 32 p refs

(NASA-TP-1241; L-12110) Avail: NTIS HC A03/MF A01  
 CSCL 01A

INCOMPRESSIBLE FLOW, LIFT, SWEEP WINGS

**N78-30055\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS AT MACH 6 OF A WING-BODY CONCEPT FOR A HYPERSONIC RESEARCH AIRPLANE**

J. L. DILLON and J. L. PITTMAN Aug. 1978 59 p refs  
 (NASA-TP-1249; L-12183) Avail: NTIS HC A04/MF A01  
 CSCL 01A

AERODYNAMIC CHARACTERISTICS, BODY-WING AND TAIL CONFIGURATIONS, HYPERSONIC AIRCRAFT, HYPERSONIC WIND TUNNELS, WIND TUNNEL MODELS

**N78-30056\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORETICAL ESTIMATION OF THE TRANSONIC AERODYNAMIC CHARACTERISTICS OF A SUPERCRITICAL-WING TRANSPORT MODEL WITH TRAILING-EDGE CONTROLS**

J. M. LUCKRING and M. J. MANN Aug. 1978 34 p refs  
 (NASA-TP-1253; L-11257) Avail: NTIS HC A03/MF A01  
 CSCL 01A

AERODYNAMIC CHARACTERISTICS, SUPERCRITICAL WINGS, SUPERSONIC AIRCRAFT, TRAILING EDGES

**N78-30057\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE WITH AND WITHOUT INLET RADIAL DISTORTION OF A TRANSONIC FAN STAGE DESIGNED FOR REDUCED LOADING IN THE TIP REGION**

J. F. SCHMIDT and R. S. RUGGERI Aug. 1978 84 p refs  
 (NASA-TP-1294; E-9246) Avail: NTIS HC A05/MF A01  
 CSCL 01A

INTAKE SYSTEMS, ROTOR BLADES (TURBOMACHINERY), TRANSONIC COMPRESSORS

**N78-31045\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS OF A HYPERSONIC RESEARCH AIRPLANE CONCEPT HAVING A 70 DEG SWEEP DOUBLE-DELTA WING AT MACH NUMBER 0.2**

J. A. PENLAND, T. R. CREEL, JR., and J. L. DILLON Sep. 1978 83 p refs

(NASA-TP-1252; L-12215) Avail: NTIS HC A05/MF A01  
 CSCL 01A

AERODYNAMIC CHARACTERISTICS, DELTA WINGS, HYPERSONIC AIRCRAFT, RESEARCH AIRCRAFT, SWEEP WINGS

**N78-32055\*#** National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.

**YF-12 EXPERIMENTS SYMPOSIUM, VOLUME 1**

Aug. 1978 286 p refs Symp. held at Edwards, Calif., 13-15 Sep. 1978 Prepared by James and Associates, Lancaster, Calif. (NASA-CP-2054-VOL-1; H-1059) Avail: NTIS HC A13/MF A01  
 CSCL 01A

CONFERENCES, NASA PROGRAMS, RESEARCH AIRCRAFT, SUPERSONIC CRUISE AIRCRAFT RESEARCH, YF-12 AIRCRAFT

**N78-32067\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL INVESTIGATION AT SUPERSONIC SPEEDS OF A CANARD-CONTROLLED MISSILE WITH FIXED AND FREE-ROLLING TAIL FINS**

A. B. BLAIR, JR. Sep. 1978 79 p refs  
 (NASA-TP-1316; L-12297) Avail: NTIS HC A05/MF A01  
 CSCL 01A

CANARD CONFIGURATIONS, FREE FLOW, SUPERSONIC SPEED, WIND TUNNEL TESTS

**N78-33050\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SUBSONIC DYNAMIC STABILITY CHARACTERISTICS OF TWO CLOSE-COUPLED CANARD-WING CONFIGURATIONS**

R. P. BOYDEN Oct. 1978 80 p refs  
 (NASA-TP-1291; L-12057) Avail: NTIS HC A05/MF A01  
 CSCL 01A

CANARD CONFIGURATIONS, DYNAMIC STABILITY, SUBSONIC SPEED

**N78-33051\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ESTIMATION OF LEADING-EDGE THRUST FOR SUPERSONIC WINGS OF ARBITRARY PLANFORM**

H. W. CARLSON and R. J. MACK Oct. 1978 51 p refs  
 (NASA-TP-1270; L-12283) Avail: NTIS HC A04/MF A01  
 CSCL 01A

DELTA WINGS, LEADING EDGES, SUPERSONIC SPEED

## 02 AERODYNAMICS

**N78-33053\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.  
**COMPARISON OF CONCURRENT STRAIN GAGE- AND PRESSURE TRANSDUCER-MEASURED FLIGHT LOADS ON A LIFTING REENTRY VEHICLE AND CORRELATION WITH WIND TUNNEL PREDICTIONS**

M. H. TANG, W. J. SEFIC, and R. G. SHELDON Oct. 1978 42 p refs  
(NASA-TP-1331; H-1035) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC LOADS, FLIGHT LOAD RECORDERS, LIFTING REENTRY VEHICLES, PRESSURE SENSORS, STRAIN GAGES

**N78-33054\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.  
**AERODYNAMIC DERIVATIVES FOR AN OBLIQUE WING AIRCRAFT ESTIMATED FROM FLIGHT DATA BY USING A MAXIMUM LIKELIHOOD TECHNIQUE**

R. E. MAINE Oct. 1978 73 p refs  
(NASA-TP-1336; H-1003) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AIRCRAFT CONFIGURATIONS, DEGREES OF FREEDOM, STABILITY DERIVATIVES, WINGS

**N79-10022\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AERODYNAMIC PERFORMANCE OF A 1.35-PRESSURE-RATIO AXIAL-FLOW FAN STAGE**

W. M. OSBORN, R. D. MOORE, and R. J. STEINKE Oct. 1978 108 p refs  
(NASA-TP-1299; E-9025) Avail: NTIS HC A06/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AXIAL FLOW, PRESSURE DISTRIBUTION, TURBOFANS

**N79-12013\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**APPLICATION OF SHOCK TUBES TO TRANSONIC AIRFOIL TESTING AT HIGH REYNOLDS NUMBERS**

W. J. COOK (Iowa State Univ.), M. J. CHANEY (Iowa State Univ.), L. L. PRESLEY, and G. T. CHAPMAN Nov. 1978 69 p refs  
(NASA-TP-1268; A-6855) Avail: NTIS HC A04/MF A01 CSCL 01A

AIRFOILS, REYNOLDS NUMBER, SHOCK TUBES, TRANSONIC FLOW

**N79-13002\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF WING LEADING-EDGE FLAP DEFLECTIONS ON SUBSONIC LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A WING-FUSELAGE CONFIGURATION WITH A 44 DEG SWEEP WING**

W. P. HENDERSON Nov. 1978 38 p refs  
(NASA-TP-1351; L-12481) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, BODY-WING CONFIGURATIONS, FLAPS (CONTROL SURFACES), LEADING EDGES, SUBSONIC FLUTTER

**N79-13003\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYSIS OF SUPERSONIC STALL BENDING FLUTTER IN AXIAL-FLOW COMPRESSOR BY ACTUATOR DISK THEORY**

J. J. ADAMCZYK Nov. 1978 58 p refs  
(NASA-TP-1345; E-9186) Avail: NTIS HC A04/MF A01 CSCL 01A

ACTUATOR DISKS, SUPERSONIC FLUTTER, TURBOCOMPRESSORS

**N79-14018\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A 16-PERCENT-THICK VARIABLE-GEOMETRY AIRFOIL DESIGNED FOR GENERAL AVIATION APPLICATIONS**

R. W. BARNWELL, K. W. NOONAN, and R. J. MCGHEE Dec. 1978 77 p refs Prepared in cooperation with Army Aviation Research and Development Command, St. Louis, Mo.  
(DA PROJ. 1L1-61102-AH-45)

(NASA-TP-1324; AVRADCOM-TR-78-45) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AIRFOIL PROFILES, GENERAL AVIATION AIRCRAFT, LOW SPEED

**N79-14019\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A LASER VELOCIMETER FLOW SURVEY ABOVE A STALLED WING**

W. H. YOUNG, JR., J. F. MEYERS, and D. R. HOAD Dec. 1978 138 p refs Prepared in cooperation with Army Aviation Research and Development Command, St. Louis, Mo.  
(DA PROJ. 1L1-61102-AH-45)

(NASA-TP-1266; AVRADCOM-TR-78-50) Avail: NTIS HC A07/MF A01 CSCL 01A

AERODYNAMIC STALLING, FLOW MEASUREMENT, LASER DOPPLER VELOCIMETERS, WINGS

**N79-14023\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORETICAL EVALUATION OF HIGH-SPEED AERODYNAMICS FOR ARROW-WING CONFIGURATIONS**

S. M. DOLLYHIGH Jan. 1979 67 p refs  
(NASA-TP-1358; L-12485) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, ARROW WINGS, SUPERSONIC CRUISE AIRCRAFT RESEARCH

**N79-14996\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THEORETICAL STUDY OF VTOL TILT-NACELLE AXISYMMETRIC INLET GEOMETRIES**

J. D. HAWK and N. O. STOCKMAN Jan. 1979 29 p refs  
(NASA-TP-1380; E-9756) Avail: NTIS HC A03/MF A01 CSCL 01A

ENGINE INLETS, INLET FLOW, NACELLES, VERTICAL TAKEOFF AIRCRAFT

**N79-15000\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SONIC-BOOM MINIMIZATION WITH NOSE-BLUNTNESS RELAXATION**

C. M. DARDEN Jan. 1979 53 p refs  
(NASA-TP-1348; L-12464) Avail: NTIS HC A04/MF A01 CSCL 20A

BLUNT BODIES, NOISE REDUCTION, NOSE CONES, SONIC BOOMS, SURFACE GEOMETRY

**N79-15902\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A STUDY OF CANARD-WING INTERFERENCE USING EXPERIMENTAL PRESSURE DATA AT TRANSONIC SPEEDS**

B. B. GLOSS and K. E. WASHBURN Jan. 1979 71 p refs  
(NASA-TP-1355; L-12491) Avail: NTIS HC A04/MF A01 CSCL 01A

CANARD CONFIGURATIONS, TRANSONIC SPEED, WIND TUNNEL TESTS

**N79-15903\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A THEORETICAL INVESTIGATION OF FOREBODY SHAPES DESIGNED FOR NATURAL LAMINAR BOUNDARY-LAYER FLOW**

R. L. BARGER Jan. 1979 18 p refs  
(NASA-TP-1375; L-12550) Avail: NTIS HC A02/MF A01  
CSCL 01A

FOREBODIES, LAMINAR BOUNDARY LAYER, SHAPES, STRUCTURAL DESIGN

**N79-16803\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF SPANWISE BLOWING ON THE SURFACE PRESSURE DISTRIBUTION AND VORTEX-LIFT CHARACTERISTICS OF A TRAPEZOIDAL WING-STRAKE CONFIGURATION**

J. F. CAMPBELL and G. E. ERICKSON (Northrop Corp., Hawthorne, Calif.) Feb. 1979 72 p refs  
(NASA-TP-1290; L-11641) Avail: NTIS HC A04/MF A01  
CSCL 01A

NOSE FINS, PRESSURE DISTRIBUTION, WING SPAN

**N79-16804\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE DESIGN OF SUPERCRITICAL WINGS BY THE USE OF THREE-DIMENSIONAL TRANSONIC THEORY**

M. J. MANN Feb. 1979 33 p refs  
(NASA-TP-1400; L-12552) Avail: NTIS HC A03/MF A01  
CSCL 01A

SUPERCRITICAL WINGS, THREE DIMENSIONAL FLOW, TRANSONIC FLOW

**N79-17806\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A MODIFICATION TO LINEARIZED THEORY FOR PREDICTION OF PRESSURE LOADINGS ON LIFTING SURFACES AT HIGH SUPERSONIC MACH NUMBERS AND LARGE ANGLES OF ATTACK**

H. W. CARLSON Feb. 1979 39 p refs  
(NASA-TP-1406; L-12654) Avail: NTIS HC A03/MF A01  
CSCL 01A

AERODYNAMIC LOADS, DELTA WINGS, PRESSURE DISTRIBUTION

**N79-17808\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STABILITY AND CONTROL CHARACTERISTICS OF A MONOPLANAR ELLIPTIC MISSILE MODEL AT MACH NUMBERS FROM 1.60 TO 2.86**

W. C. SAWYER and G. SANGIORGIO Feb. 1979 49 p refs  
(NASA-TP-1352; L-12268) Avail: NTIS HC A03/MF A01  
CSCL 01A

AERODYNAMIC CHARACTERISTICS, MISSILE CONTROL

**N79-17809\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN EXPERIMENTAL WIND-TUNNEL INVESTIGATION OF A RAM-AIR-SPOILER ROLL-CONTROL DEVICE ON A FORWARD-CONTROL MISSILE AT SUPERSONIC SPEEDS**

A. B. BLAIR, JR. Dec. 1978 191 p refs  
(NASA-TP-1353; L-12518) Avail: NTIS HC A09/MF A01  
CSCL 01A

CANARD CONFIGURATIONS, CRUCIFORM WINGS, LATERAL CONTROL, RAMJET MISSILES, SPOILERS, SUPERSONIC SPEED, WIND TUNNEL TESTS

**N79-17810\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SPACE SHUTTLE AFTERBODY AERODYNAMICS/PLUME SIMULATION DATA SUMMARY**

K. L. BLACKWELL and L. M. HAIR (REMTECH, Inc., Huntsville, Ala.) Dec. 1978 195 p refs  
(NASA-TP-1384; M-276) Avail: NTIS HC A09/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, PLUMES, SPACE SHUTTLES, WIND TUNNEL TESTS

**N79-18915\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**APPROXIMATION CONCEPTS FOR NUMERICAL AIRFOIL OPTIMIZATION**

G. N. VANDERPLAATS Mar. 1979 38 p refs  
(NASA-TP-1370; A-7682) Avail: NTIS HC A03/MF A01 CSCL 01A

AIRFOIL PROFILES, NUMERICAL ANALYSIS, OPTIMAL CONTROL

**N79-20030\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ADVANCED TECHNOLOGY AIRFOIL RESEARCH, VOLUME 1, PART 1**

1979 454 p refs Conf. held at Hampton, Va., 7-9 Mar. 1978  
(NASA-CP-2045-PT-1; L-12232-VOL-1-PT-1) Avail: NTIS HC A20/MF A01 CSCL 01A

AERODYNAMICS, AIRFOILS, COMPUTER PROGRAMS, CONFERENCES, DESIGN ANALYSIS, TEST FACILITIES, WIND TUNNEL TESTS

**N79-20071\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DETERMINATION OF STABILITY AND CONTROL PARAMETERS OF A LIGHT AIRPLANE FROM FLIGHT DATA USING TWO ESTIMATION METHODS**

V. KLEIN Mar. 1979 102 p refs  
(NASA-TP-1306; L-12291) Avail: NTIS HC A06/MF A01  
CSCL 01A

AERODYNAMIC STABILITY, AIRCRAFT CONTROL, IN-FLIGHT MONITORING, LIGHT AIRCRAFT, MAXIMUM LIKELIHOOD ESTIMATES, REGRESSION ANALYSIS

**N79-22037\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL INVESTIGATION OF THREE HELICOPTER ROTOR AIRFOILS DESIGNED ANALYTICALLY**

G. J. BINGHAM and K. W. NOONAN Apr. 1979 95 p refs  
Prepared in cooperation with Army Aviation Res. and Develop. Command, Hampton, Va.  
(DA PROJ. 1L1-61102-AH-45)  
(NASA-TP-1396; L-11703; AVRADCOM-TR-79-11) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AIRFOIL PROFILES, ROTARY WINGS, ROTOR AERODYNAMICS, WIND TUNNEL TESTS

**N79-22038\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED WIND-TUNNEL PARAMETRIC INVESTIGATION OF FLIGHT SPOILERS AS TRAILING-VORTEX-ALLEVIATION DEVICES ON A TRANSPORT AIRCRAFT MODEL**

D. R. CROOM Washington Apr. 1979 46 p refs  
(NASA-TP-1419; L-12622) Avail: NTIS HC A03/MF A01  
CSCL 01A

AIRCRAFT MODELS, LOW SPEED WIND TUNNELS, SPOILERS, TRANSPORT AIRCRAFT, VORTICES, WIND TUNNEL TESTS

## 02 AERODYNAMICS

**N79-22043\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**ONSET OF CONDENSATION EFFECTS WITH AN NACA 0012-64 AIRFOIL TESTED IN THE LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL**

R. M. HALL Apr. 1979 72 p refs  
(NASA-TP-1385; L-12581) Avail: NTIS HC A04/MF A01  
CSCL 01A

AIRFOILS, CRYOGENIC WIND TUNNELS, NASA PROGRAMS, TRANSONIC WIND TUNNELS

**N79-23012\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**FLIGHT INVESTIGATION OF PILOTING TECHNIQUES AND CROSSWIND LIMITATIONS USING A RESEARCH TYPE CROSSWIND LANDING GEAR**

B. D. FISHER, P. L. DEAL, R. A. CHAMPINE, and J. M. PATTON, JR. May 1979 55 p refs  
(NASA-TP-1423; L-12682) Avail: NTIS HC A04/MF A01  
CSCL 01A

AIRCRAFT LANDING, CROSS FLOW, FLIGHT TESTS, LANDING GEAR, PILOT PERFORMANCE

**N79-23013\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AERODYNAMIC CHARACTERISTICS AT MACH NUMBERS OF 1.5, 1.8, AND 2.0 OF A BLENDED WING-BODY CONFIGURATION WITH AND WITHOUT INTEGRAL CANARDS**

A. W. ROBINS, M. LAMB, and D. S. MILLER May 1979 56 p refs  
(NASA-TP-1427; L-12727) Avail: NTIS HC A04/MF A01  
CSCL 01A

AERODYNAMIC CHARACTERISTICS, BODY-WING CONFIGURATIONS, CANARD CONFIGURATIONS

**N79-23912\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **AIRCRAFT ICING**

B. J. BLAHA, comp. 1979 147 p refs Workshop held at Cleveland, 19-21 Jul. 1978  
(NASA-CP-2086; FAA-RD-78-109; E-027) Avail: NTIS HC A07/MF A01 CSCL 01C

AIRCRAFT HAZARDS, CONFERENCES, ICE FORMATION

**N79-24961\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED WIND-TUNNEL INVESTIGATION OF WING FINS AS TRAILING-VORTEX-ALLEVATION DEVICES ON A TRANSPORT AIRPLANE MODEL**

D. R. CROOM and G. T. HOLBROOK Jun. 1979 30 p refs  
(NASA-TP-1453; L-12776) Avail: NTIS HC A03/MF A01  
CSCL 01A

FINS, TRAILING EDGES, TRANSPORT AIRCRAFT, VORTICES, WIND TUNNEL TESTS, WINGS

**N79-26020\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF WING LEADING-EDGE DEFLECTION ON LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A LOW-ASPECT-RATIO HIGHLY SWEEPED ARROW-WING CONFIGURATION**

P. L. COE, JR. and R. P. WESTON 1979 73 p refs  
(NASA-TP-1434; L-12784) Avail: NTIS HC A04/MF A01  
CSCL 01A

AERODYNAMIC CHARACTERISTICS, ARROW WINGS, LEADING EDGES, LOW ASPECT RATIO WINGS, LOW SPEED STABILITY, WIND TUNNEL TESTS

**N79-26022\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF SEVERAL GEOMETRIC PARAMETERS ON THE STATIC INTERNAL PERFORMANCE OF THREE NONAXISYMMETRIC NOZZLE CONCEPTS**

B. L. BERRIER and R. J. RE Jul. 1979 136 p refs  
(NASA-TP-1468; L-12810) Avail: NTIS HC A07/MF A01  
CSCL 01A

CONVERGENT-DIVERGENT NOZZLES, GIMBALS, STATIC TESTS

**N79-29146\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE EFFECT OF NONMETRIC OVER-THE-WING NACELLES ON WING-BODY AERODYNAMICS**

D. E. REUBUSH Aug. 1979 79 p refs  
(NASA-TP-1503; L-13010) Avail: NTIS HC A05/MF A01  
CSCL 01A

AERODYNAMIC CONFIGURATIONS, DRAG, TRANSPORT AIRCRAFT, WIND TUNNEL TESTS, WING NACELLE CONFIGURATIONS

**N79-33164\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A VECTORED-ENGINE-OVER-WING CONFIGURATION AT SUBSONIC SPEEDS**

L. D. LEAVITT Oct. 1979 136 p refs  
(NASA-TP-1533; L-13108) Avail: NTIS HC A07/MF A01  
CSCL 01A

AERODYNAMIC CHARACTERISTICS, SUBSONIC SPEED, UPPER SURFACE BLOWN FLAPS, WIND TUNNEL TESTS, WING NACELLE CONFIGURATIONS

**N80-10101\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF WINGLETS ON A FIRST-GENERATION JET TRANSPORT WING. 6: STABILITY CHARACTERISTICS FOR A FULL-SPAN MODEL AT SUBSONIC SPEEDS**

S. G. FLECHNER Oct. 1979 69 p refs  
(NASA-TP-1330; L-12514) Avail: NTIS HC A04/MF A01  
CSCL 01A

AIRCRAFT MODELS, DRAG REDUCTION, SUBSONIC SPEED, TRANSPORT AIRCRAFT, WIND TUNNEL STABILITY TESTS, WINGLETS, WINGS

**N80-10102\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL INVESTIGATION OF THE VALIDITY OF A SONIC-BOOM-MINIMIZATION CONCEPT**

R. J. MACK and C. M. DARDEN Oct. 1979 47 p refs  
(NASA-TP-1421; L-12661) Avail: NTIS HC A03/MF A01  
CSCL 01A

AIRCRAFT DESIGN, OPTIMIZATION, OVERPRESSURE, SONIC BOOMS, SUPERSONIC TRANSPORTS, WIND TUNNEL TESTS

**N80-10105\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ESTIMATION OF ATTAINABLE LEADING-EDGE THRUST FOR WINGS AT SUBSONIC AND SUPERSONIC SPEEDS**

H. W. CARLSON, R. J. MACK, and R. L. BARGER 1979 62 p refs  
(NASA-TP-1500; L-13032) Avail: NTIS HC A04/MF A01  
CSCL 01A

ESTIMATES, LEADING EDGES, PREDICTION ANALYSIS TECHNIQUES, SUBSONIC SPEED, SUPERSONIC SPEED, THRUST, WINGS



**N80-10107\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**WORKSHOP ON THRUST AUGMENTING EJECTORS**

A. E. LOPEZ, ed., D. G. KOENIG, ed., D. S. GREEN, ed. (Naval Air Development Center, Warminster, Penn.), and K. S. NAGARAJA, ed. (Air Force Flight Dynamics Lab) Sep. 1979 509 p Conf. held at Moffett Field, Calif., 28-29 Jun. 1978; Sponsored by NADC and AFFDL

(NASA-CP-2093; A-7887) Avail: NTIS HC A22/MF A01 CSCL 01A

CONFERENCES, EJECTORS, NOZZLE FLOW, POWERED LIFT AIRCRAFT, THRUST AUGMENTATION

**N80-11035\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**FLIGHT-MEASURED AFTERBODY PRESSURE COEFFICIENTS FROM AN AIRPLANE HAVING TWIN SIDE-BY-SIDE JET ENGINES FOR MACH NUMBERS FROM 0.6 TO 1.6**

L. L. STEERS Washington Nov. 1979 88 p refs (NASA-TP-1549; H-1066) Avail: NTIS HC A05/MF A01 CSCL 01A

AFTERBODIES, IN-FLIGHT MONITORING, JET EXHAUST, MACH NUMBER

**N80-11036\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FUSELAGE AND NOZZLE PRESSURE DISTRIBUTIONS ON A 1/12-SCALE F-15 PROPULSION MODEL AT TRANSONIC SPEEDS**

O. C. PENDERGRAFT, JR. Nov. 1979 140 p refs (NASA-TP-1521; L-12948) Avail: NTIS HC A07/MF A01 CSCL 01A

AIRCRAFT MODELS, EXHAUST NOZZLES, FUSELAGES, NOZZLE FLOW, PRESSURE DISTRIBUTION

**N80-12064\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS OF A HYPERSONIC RESEARCH AIRPLANE CONCEPT HAVING A 70 DEG SWEEP DOUBLE-DELTA WING AT MACH NUMBERS FROM 0.80 TO 1.20, WITH SUMMARY OF DATA FROM 0.20 TO 6.0**

J. A. PENLAND, J. B. HALLISSY, and J. L. DILLON Washington Dec. 1979 147 p refs (NASA-TP-1552; L-13158) Avail: NTIS HC A07/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, COMPUTATIONAL FLUID DYNAMICS, DELTA WINGS, HYPERSONIC AIRCRAFT, WIND TUNNEL TESTS

**N80-12065\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPLICATION OF SUPERSONIC LINEAR THEORY AND HYPERSONIC IMPACT METHODS TO THREE NONSLENDER HYPERSONIC AIRPLANE CONCEPTS AT MACH NUMBERS FROM 1.10 TO 2.86**

J. L. PITTMAN Washington Dec. 1979 59 p refs (NASA-TP-1539; L-13142) Avail: NTIS HC A04/MF A01 CSCL 10A

AERODYNAMIC CHARACTERISTICS, HYPERSONICS, MACH NUMBER, SUPERSONIC AIRCRAFT, SUPERSONICS

**N80-12994\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SUMMARY OF LOW-SPEED LONGITUDINAL AERODYNAMICS OF TWO POWERED CLOSE-COUPLED WING-CANARD FIGHTER CONFIGURATIONS**

J. W. PAULSON, JR. and J. L. THOMAS Washington Dec. 1979 92 p refs (NASA-TP-1535; L-13157) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, CANARD CONFIGURATIONS, FIGHTER AIRCRAFT, LOW SPEED STABILITY

**N80-12995\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INCLUSION OF UNSTEADY AERODYNAMICS IN LONGITUDINAL PARAMETER ESTIMATION FROM FLIGHT DATA**

M. J. QUEIJO, W. R. WELLS (Wright State Univ., Dayton, Ohio), and D. A. KESKAR Washington Dec. 1979 52 p refs (NASA-TP-1536; L-13009) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMICS, FLIGHT CHARACTERISTICS, MATHEMATICAL MODELS, PARAMETERIZATION, VORTICES

**N80-13001\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF FLOW CHARACTERISTICS OVER MISSILE BODIES AT SUPERSONIC SPEEDS**

R. L. BARGER and W. C. SAWYER Dec. 1979 41 p refs (NASA-TP-1579; L-13224) Avail: NTIS HC A03/MF A01 CSCL 01A

BOUNDARY LAYER SEPARATION, FLOW DISTRIBUTION, MISSILE BODIES, SEPARATED FLOW, SUPERSONIC SPEED

**N80-13002\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**EFFECTS OF FUSELAGE FOREBODY GEOMETRY ON LOW-SPEED LATERAL-DIRECTIONAL CHARACTERISTICS OF TWIN-TAIL FIGHTER MODEL AT HIGH ANGLES OF ATTACK**

P. C. CARR and W. P. GILBERT Dec. 1979 73 p refs (NASA-TP-1592; L-13270) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AIRCRAFT DESIGN, ANGLE OF ATTACK, FIGHTER AIRCRAFT, FOREBODIES, LOW SPEED WIND TUNNELS

**N80-14045\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SONIC-BOOM WAVE-FRONT SHAPES AND CURVATURES ASSOCIATED WITH MANEUVERING FLIGHT**

R. L. BARGER Dec. 1979 30 p refs (NASA-TP-1611; L-13339) Avail: NTIS HC A03/MF A01 CSCL 01A

AIRCRAFT MANEUVERS, CURVATURE, SHOCK WAVE INTERACTION, SONIC BOOMS, WAVE FRONTS

**N80-15033\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**CLASSICAL AERODYNAMIC THEORY**

R. T. JONES, comp. Dec. 1979 308 p refs (NASA-RP-1050; A-7556) Avail: NTIS HC A14/MF A01 CSCL 01A

A collection of papers on modern theoretical aerodynamics is presented. Included are theories of incompressible potential flow and research on the aerodynamic forces on wing and wing sections of aircraft and on airship hulls. For individual titles, see N80-15034 through N80-15047.

**N80-16032\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL/FLIGHT CORRELATION STUDY OF AERODYNAMIC CHARACTERISTICS OF A LARGE FLEXIBLE SUPERSONIC CRUISE AIRPLANE (XB-70) 2: EXTRAPOLATION OF WIND-TUNNEL DATA TO FULL-SCALE CONDITIONS**

J. B. PETERSON, JR., M. J. MANN, R. B. SORRELLS, III, W. C. SAWYER, and D. E. FULLER Feb. 1980 80 p refs (NASA-TP-1515; L-12688) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, B-70 AIRCRAFT, FLIGHT TESTS, WIND TUNNEL TESTS

## 02 AERODYNAMICS

**N80-17030\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PREDICTION METHOD FOR TWO-DIMENSIONAL AERODYNAMIC LOSSES OF COOLED VANES USING INTEGRAL BOUNDARY-LAYER PARAMETERS**

L. J. GOLDMAN and R. E. AUGLER Feb. 1980 43 p refs (NASA-TP-1623; E-076) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, BOUNDARY LAYERS, HEAT TRANSFER, PREDICTION ANALYSIS TECHNIQUES, TURBINE BLADES, TWO DIMENSIONAL FLOW

**N80-17984\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**AN EXPERIMENTAL INVESTIGATION OF TWO LARGE ANNULAR DIFFUSERS WITH SWIRLING AND DISTORTED INFLOW**

W. T. ECKERT, J. P. JOHNSTON (Stanford Univ., Calif.), T. D. SIMONS (Stanford Univ., Calif.), K. W. MORT, and V. R. PAGE Feb. 1980 106 p refs (NASA-TP-1628; AVRADCOM-TR-79-40; A-7436) Avail: NTIS HC A06/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, EXHAUST DIFFUSERS, FLOW DISTORTION, SWIRLING

**N80-17986\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**WIND-TUNNEL/FLIGHT CORRELATION STUDY OF AERODYNAMIC CHARACTERISTICS OF A LARGE FLEXIBLE SUPERSONIC CRUISE AIRPLANE (XB-70-1). 3: A COMPARISON BETWEEN CHARACTERISTICS PREDICTED FROM WIND-TUNNEL MEASUREMENTS AND THOSE MEASURED IN FLIGHT**

H. H. ARNAIZ, J. B. PETERSON, JR. (NASA. Langley Research Center), and J. C. DAUGHERTY (NASA. Ames Research Center) Mar. 1980 59 p refs (NASA-TP-1516; H-1079) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, B-70 AIRCRAFT, DATA CORRELATION, FLIGHT TESTS, WIND TUNNEL TESTS

**N80-19031\*#** National Aeronautics and Space Administration, Washington, D.C.

**APPLICATION OF A NUMERICALLY GENERATED ORTHOGONAL COORDINATE SYSTEM TO THE SOLUTION OF INVISCID AXISYMMETRIC SUPERSONIC FLOW OVER BLUNT BODIES**

H. H. HAMILTON, II and R. A. GRAVES, JR. Mar. 1980 61 p (NASA-TP-1619; L-13353) Avail: NTIS HC A04/MF A01 CSCL 01A

BLUNT BODIES, COORDINATES, INVISCID FLOW, ORTHOGONALITY, SUPERSONIC FLOW

**N80-21279\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SUPERSONIC WINGS WITH SIGNIFICANT LEADING-EDGE THRUST AT CRUISE**

A. W. ROBINS, H. W. CARLSON, and R. J. MACK Apr. 1980 28 p refs (NASA-TP-1632; L-13316) Avail: NTIS HCA03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, LEADING EDGE SWEEP, SUPERSONIC AIRFOILS, THRUST, WING PLANFORMS

**N80-21280\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPARISON OF PREDICTED AND EXPERIMENTAL REAL-GAS PRESSURE DISTRIBUTIONS ON SPACE SHUTTLE ORBITER NOSE FOR SHUTTLE ENTRY AIR DATA SYSTEM**

J. L. SHINN Apr. 1980 29 p refs (NASA-TP-1627; L-13341) Avail: NTIS HC A03/MF A01 CSCL 01A

AIR DATA SYSTEMS, NOSE TIPS, REENTRY EFFECTS, SPACE SHUTTLE ORBITERS, SPACE TRANSPORTATION SYSTEM

**N80-21283\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ADVANCED TECHNOLOGY AIRFOIL RESEARCH, VOLUME 2**

1979 262 p refs Presented at conf., Langley Research Center, Hampton, Va. 7-9 Mar. 1978 (NASA-CP-2046; L-12232) Avail: NTIS HC A12/MF A01 CSCL 01A

AIRFOILS, CONFERENCES, TECHNOLOGY ASSESSMENT, TECHNOLOGY UTILIZATION

**N80-22261\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VISCOUS-INVISCID CALCULATIONS OF JET ENTRAINMENT EFFECTS ON THE SUBSONIC FLOW OVER NOZZLE AFTERBODIES**

R. G. WILMOTH Apr. 1980 79 p refs (NASA-TP-1626; L-13362) Avail: NTIS HC A05/MF A01 CSCL 01A

AFTERBODIES, COMPUTER PROGRAMS, ENTRAINMENT, INVISCID FLOW, JET EXHAUST, SUBSONIC FLOW, VISCOUS FLOW

**N80-22262\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF THE FLOW FIELD SURROUNDING CIRCULAR-ARC BOATTAIL NOZZLES AT SUBSONIC SPEEDS**

W. K. ABEYOUNIS and L. E. PUTNAM May 1980 51 p refs (NASA-TP-1633; L-13318) Avail: NTIS HC A04/MF A01 CSCL 01A

BOATTAILS, FLOW DISTRIBUTION, JET EXHAUST, NOZZLE DESIGN, SUBSONIC SPEED

**N80-22265\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORETICAL PREDICTION OF NONLINEAR PROPAGATION EFFECTS ON NOISE SIGNATURES GENERATED BY SUBSONIC OR SUPERSONIC PROPELLER OR ROTOR-BLADE TIPS**

R. L. BARGER May 1980 18 p refs (NASA-TP-1660; L-13388) Avail: NTIS HC A02/MF A01 CSCL 01A

AIRCRAFT NOISE, NOISE PROPAGATION, NONLINEAR EQUATIONS, PROPAGATION MODES, SOUND GENERATORS

**N80-22266\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FULL-SCALE WIND TUNNEL-INVESIGATION OF THE ADVANCED TECHNOLOGY LIGHT TWIN-ENGINE AIRPLANE (ATLIT)**

J. L. HASSELL, JR., W. A. NEWSOM, JR., and L. P. YIP May 1980 212 p refs (NASA-TP-1591; L-13135) Avail: NTIS HC A10/MF A01 CSCL 01A

AERODYNAMIC STABILITY, AIRCRAFT CONTROL, AIRCRAFT PERFORMANCE, ATLIT PROJECT, FULL SCALE TESTS, WIND TUNNEL TESTS

**N80-24261\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORY FOR COMPUTING THE SIZE AND SHAPE OF A REGION OF INFLUENCE ASSOCIATED WITH A MANEUVERING VEHICLE**

R. L. BARGER May 1980 22 p refs  
(NASA-TP-1648; L-13419) Avail: NTIS HC A02/MF A01  
CSCL 01A

AIRCRAFT MANEUVERS, AIRCRAFT PERFORMANCE, MANEUVERABILITY, TRAJECTORY ANALYSIS

**N80-24267\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF AXISYMMETRIC AND NONAXISYMMETRIC NOZZLES INSTALLED ON A 0.10 SCALE F-18 PROTOTYPE AIRPLANE MODEL**

F. J. CAPONE and B. L. BERRIER Jun. 1980 304 p refs  
(NASA-TP-1638; L-13401) Avail: NTIS HC A14/MF A01  
CSCL 01A

AERODYNAMIC CHARACTERISTICS, F-18 AIRCRAFT, NOZZLE FLOW, NOZZLE GEOMETRY, THRUST, WIND TUNNEL TESTS

**N80-25296\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DEVELOPMENT AND VALIDATION OF A COMBINED ROTOR FUSELAGE INDUCED FLOW FIELD COMPUTATIONAL METHOD**

C. E. FREEMAN Jun. 1980 61 p refs Prepared in cooperation with Army Aviation Research and Development Command, St. Louis, Mo.  
(NASA-TP-1656; AVRADCOM-TR-80-B-3; L-13363) Avail: NTIS HC A04/MF A01 CSCL 01A

COMPUTATIONAL FLUID DYNAMICS, DOWNWASH, HELICOPTER WAKES, PANEL METHOD (FLUID DYNAMICS), ROTOR AERODYNAMICS, WIND TUNNEL TESTS

**N80-27283\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF REYNOLDS NUMBER ON STABILITY CHARACTERISTICS OF A CRUCIFORM WING-BODY**

R. L. STALLINGS, JR., M. LAMB, and C. B. WATSON Jul. 1980 111 p refs  
(NASA-TP-1683; L-13530) Avail: NTIS HC A06/MF A01  
CSCL 01A

CRUCIFORM WINGS, REYNOLDS NUMBER, SUPERSONIC FLOW, SUPERSONIC WIND TUNNELS, WIND TUNNEL STABILITY TESTS

**N80-27284\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CAS2D: FORTRAN PROGRAM FOR NONROTATING BLADE-TO-BLADE, STEADY, POTENTIAL TRANSONIC CASCADE FLOWS**

D. S. DULIKRAVICH Jul. 1980 36 p refs  
(NASA-TP-1705; E-253) Avail: NTIS HC A03/MF A01 CSCL 01A

CASCADE FLOW, COMPUTER PROGRAMS, MATHEMATICAL MODELS, TRANSONIC FLOW, TURBOMACHINE BLADES

**N80-28304\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WATER-TUNNEL AND ANALYTICAL INVESTIGATION OF THE EFFECT OF STRAKE DESIGN VARIABLES ON STRAKE VORTEX BREAKDOWN CHARACTERISTICS**

N. T. FRINK and J. E. LAMAR Aug. 1980 92 p refs  
(NASA-TP-1676; L-13254) Avail: NTIS HC A05/MF A01  
CSCL 01A

CONTROL SURFACES, HYDRAULIC TEST TUNNELS, NOSE FINS, SCALE MODELS, VORTICES

**N80-29250\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE EFFECT OF THROAT CONTOURING ON TWO-DIMENSIONAL CONVERGING-DIVERGING NOZZLES AT STATIC CONDITIONS**

M. L. MASON, L. E. PUTNAM, and R. J. RE Aug. 1980 70 p refs  
(NASA-TP-1704; L-13591) Avail: NTIS HC A04/MF A01  
CSCL 01A

CONVERGENT-DIVERGENT NOZZLES, NOZZLE EFFICIENCY, STATIC TESTS, THROATS

**N80-32333\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS OF THREE HELICOPTER ROTOR AIRFOIL SECTIONS AT REYNOLDS NUMBER FROM MODEL SCALE TO FULL SCALE AT MACH NUMBERS FROM 0.35 TO 0.90**

K. W. NOONAN and G. J. BINGHAM Sep. 1980 85 p refs  
Prepared in cooperation with Army Aviation Research and Development Command, St. Louis, Mo.  
(DA PROJ. 1L1-61102-AH-45)

(NASA-TP-1701; L-13139; AVRADCOM-TR-80-B-5) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AIRFOILS, HELICOPTERS, REYNOLDS NUMBER, WIND TUNNEL TESTS

**N80-32334\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A NEW THEORY FOR RAPID CALCULATION OF THE GROUND PATTERN OF THE INCIDENT SOUND INTENSITY PRODUCED BY A MANEUVERING JET AIRPLANE**

R. L. BARGER Washington Sep. 1980 24 p refs  
(NASA-TP-1733; L-13629) Avail: NTIS HC A02/MF A01  
CSCL 01A

AIRPORT PLANNING, JET AIRCRAFT NOISE, NOISE MEASUREMENT, NOISE POLLUTION

**N80-33356\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**CALCULATION OF THREE-DIMENSIONAL UNSTEADY TRANSONIC FLOWS PAST HELICOPTER BLADES**

J. J. CHATTOT Oct. 1980 32 p refs Prepared in cooperation with Army Aviation Research and Development Command, Moffett Field, Calif.

(NASA-TP-1721; A-8024) Avail: NTIS HC A03/MF A01 CSCL 01A

FINITE DIFFERENCE THEORY, HELICOPTER DESIGN, NUMERICAL ANALYSIS, ROTOR AERODYNAMICS, TRANSONIC FLOW

**N80-33357\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**WIND: COMPUTER PROGRAM FOR CALCULATION OF THREE DIMENSIONAL POTENTIAL COMPRESSIBLE FLOW ABOUT WIND TURBINE ROTOR BLADES**

D. S. DULIKRAVICH Oct. 1980 20 p refs  
(NASA-TP-1729; E-474) Avail: NTIS HC A02/MF A01 CSCL 01A

COMPRESSIBLE FLOW, COMPUTER PROGRAMS, NUMERICAL FLOW VISUALIZATION, THREE DIMENSIONAL FLOW, TURBINE BLADES, WINDMILLS (WINDPOWERED MACHINES)

**N81-10004\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ESTIMATION OF WING NONLINEAR AERODYNAMIC CHARACTERISTICS AT SUPERSONIC SPEEDS**

H. W. CARLSON and R. J. MACK Nov. 1980 84 p refs  
(NASA-TP-1718; L-13589) Avail: NTIS HC A05/MF A01  
CSCL 01A

AERODYNAMIC CHARACTERISTICS, COMPUTER

## 02 AERODYNAMICS

PROGRAMS, NONLINEARITY, SUPERSONIC SPEED, WING LOADING

**N81-10005\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A FAN PRESSURE RATIO CORRELATION IN TERMS OF MACH NUMBER AND REYNOLDS NUMBER FOR THE LANGLEY 0.3 METER TRANSONIC CRYOGENIC TUNNEL**

P. L. LAWING, J. B. ADCOCK, and C. L. LADSON Nov. 1980 21 p refs

(NASA-TP-1752; L-13713) Avail: NTIS HC A02/MF A01

CSSL 01A

CRYOGENIC WIND TUNNELS, MACH NUMBER, REYNOLDS NUMBER, SCALING LAWS, TRANSONIC WIND TUNNELS, WIND TUNNEL CALIBRATION

**N81-12015\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A 13 PERCENT THICK MEDIUM SPEED AIRFOIL DESIGNED FOR GENERAL AVIATION APPLICATIONS**

R. J. MCGHEE and W. D. BEASLEY Aug. 1979 79 p refs

(NASA-TP-1498; L-12976) Avail: NTIS HC A04/MF A01

CSSL 01A

AIRCRAFT DESIGN, ANGLE OF ATTACK, GENERAL AVIATION AIRCRAFT, WIND TUNNEL TESTS

**N81-12021\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND THEORETICAL AERODYNAMIC CHARACTERISTICS OF TWO HYPERSONIC CRUISE AIRCRAFT CONCEPTS AT MACH NUMBERS OF 2.96, 3.96, AND 4.63**

J. L. PITTMAN and G. D. RIEBE Dec. 1980 116 p refs

(NASA-TP-1767; L-13868) Avail: NTIS HC A06/MF A01

CSSL 01A

ANGLE OF ATTACK, LIFT, NACELLES, SUPERSONIC AIRCRAFT, SUPERSONIC DRAG

**N81-13919\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NUMERICAL SOLUTIONS OF THE NAVIER-STOKES EQUATIONS FOR TRANSONIC AFTERBODY FLOWS**

R. C. SWANSON, JR. Dec. 1980 60 p refs

(NASA-TP-1784; L-13826) Avail: NTIS HC A04/MF A01

CSSL 01A

BOATTAILS, FINITE DIFFERENCE THEORY, NAVIER-STOKES EQUATION, PLUMES, TRANSONIC FLOW

**N81-14972\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF CONVERGENT-DIVERGENT NOZZLES APPLICABLE TO REDUCED-POWER SUPERSONIC CRUISE AIRCRAFT**

B. L. BERRIER and R. J. RE Dec. 1980 218 p refs

(NASA-TP-1766; L-13974) Avail: NTIS HC A10/MF A01

CSSL 01A

CONVERGENT-DIVERGENT NOZZLES, NOZZLE DESIGN, PERFORMANCE TESTS

**N81-14973\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**BIBLIOGRAPHY OF SUPERSONIC CRUISE RESEARCH (SCR) PROGRAM FROM 1977 TO MID-1980**

S. HOFFMAN Dec. 1980 106 p

(NASA-RP-1063; L-13764) Avail: NTIS HC A06/MF A01

CSSL 01A

The supersonic cruise research (SCR) program, initiated in July 1972, includes system studies and the following disciplines: propulsion, stratospheric emission impact, structures and materials, aerodynamic performance, and stability and control. In a coordinated effort to provide a sound basis for any future consideration that may be given by the United States to the development of an acceptable commercial supersonic transport, integration of the technical disciplines was undertaken, analytical

tools were developed, and wind tunnel, flight, and laboratory investigations were conducted. The present bibliography covers the time period from 1977 to mid-1980. It is arranged according to system studies and the above five SCR disciplines. There are 306 NASA reports and 135 articles, meeting papers, and company reports cited. E.D.K.

**N81-14974\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LEADING-EDGE DEFLECTION OPTIMIZATION FOR A HIGHLY SWEEPED ARROW WING CONFIGURATION**

P. L. COE, JR., J. K. HUFFMAN, and J. W. FENBERT Dec. 1980 59 p refs

(NASA-TP-1777; L-13820) Avail: NTIS HC A04/MF A01

CSSL 01A

AERODYNAMIC CONFIGURATIONS, ARROW WINGS, DEFLECTION, LATERAL STABILITY, LEADING EDGES

**N81-14975\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL MEASUREMENTS AND COMPARISON WITH FLIGHT OF THE BOUNDARY LAYER AND HEAT TRANSFER ON A HOLLOW CYLINDER AT MACH 3**

R. L. STALLINGS, JR. and M. LAMB Dec. 1980 48 p refs

(NASA-TP-1789; L-14044) Avail: NTIS HC A03/MF A01

CSSL 01A

BOUNDARY LAYER FLOW, CYLINDRICAL SHELLS, DRAG MEASUREMENT, HEAT TRANSFER, REYNOLDS NUMBER, SKIN FRICTION, SUPERSONIC BOUNDARY LAYERS, WIND TUNNEL TESTS

**N81-15976\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF SIDEWALL GEOMETRY ON THE INSTALLED PERFORMANCE OF NONAXISYMMETRIC CONVERGENT-DIVERGENT EXHAUST NOZZLES**

J. A. YETTER (George Washington Univ., Hampton, Va.) and L.

D. LEAVITT Dec. 1980 119 p refs

(NASA-TP-1771; L-13826) Avail: NTIS HC A06/MF A01

CSSL 01A

CONVERGENT-DIVERGENT NOZZLES, EXHAUST FLOW SIMULATION, EXHAUST NOZZLES, JET EXHAUST, NOZZLE DESIGN, NOZZLE GEOMETRY, NOZZLE WALLS

**N81-16977\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**STEADY AND NONSTEADY SUPERSONIC TURBULENT AFTERBODY FLOW**

K. K. YOSHIKAWA and A. A. WRAY Feb. 1981 23 p refs

(NASA-TP-1769; A-8271) Avail: NTIS HC A02/MF A01

CSSL 01A

AXISYMMETRIC FLOW, FLOW DISTRIBUTION, NUMERICAL FLOW VISUALIZATION, STEADY FLOW, SUPERSONIC FLOW, TURBULENT FLOW, UNSTEADY FLOW

**N81-19019\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AEROPROPULSIVE CHARACTERISTICS OF TWIN NONAXISYMMETRIC VECTORING NOZZLES INSTALLED WITH FORWARD-SWEEPED AND AFT-SWEEPED WINGS**

F. J. CAPONE Mar. 1981 260 p

(NASA-TP-1778; L-13902) Avail: NTIS HC A12/MF A01

CSSL 01A

AERODYNAMIC CHARACTERISTICS, CONVERGENT-DIVERGENT NOZZLES, SWEEPED FORWARD WINGS, SWEEPED BACK WINGS, WIND TUNNEL TESTS

**N81-20026\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**A COMPUTER TECHNIQUE FOR DETAILED ANALYSIS OF MISSION RADIUS AND MANEUVERABILITY CHARACTERISTICS OF FIGHTER AIRCRAFT**

W. E. FOSS, JR. Mar. 1981 67 p  
 (NASA-TP-1837; L-14213) Avail: NTIS HC A04/MF A01  
 CSCL 01A

AERODYNAMICS, AIRCRAFT MANEUVERS, COMPUTER TECHNIQUES, MANEUVERABILITY, MISSION PLANNING

**N81-21016\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CHARTS FOR DETERMINING POTENTIAL MINIMUM SONIC-BOOM OVERPRESSURES FOR SUPERSONIC CRUISE AIRCRAFT**

C. M. DARDEN Mar. 1981 49 p refs  
 (NASA-TP-1820; L-14190) Avail: NTIS HC A03/MF A01  
 CSCL 01A

ACOUSTIC VELOCITY, GRAPHS (CHARTS), OVERPRESSURE, SONIC BOOMS, SUPERSONIC CRUISE AIRCRAFT RESEARCH

**N81-22016\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PRESSURE AND FORCE DATA FOR A FLAT WING AND A WARPED CONICAL WING HAVING A SHOCKLESS RECOMPRESSION AT MACH 1.62**

D. S. MILLER, E. J. LANDRUM, J. C. TOWNSEND, and W. H. MASON, (Grumman Aerospace Corp., Bethpage, N.Y.) Apr. 1981 333 p refs

(NASA-TP-1759; L-13856) Avail: NTIS HC A15/MF A01  
 CSCL 10A

CAMBERED WINGS, COMPUTER AIDED DESIGN, CONICAL FLOW, CROSS FLOW, SUPERCRITICAL FLOW

**N81-22017\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**IMPROVED METHOD FOR CALCULATING TRANSONIC VELOCITIES ON BLADE-TO-BLADE STREAM SURFACES OF A TURBOMACHINE**

J. R. WOOD Apr. 1981 28 p refs  
 (NASA-TP-1772; E-128) Avail: NTIS HC A03/MF A01  
 CSCL 01A

AXIAL FLOW TURBINES, TRANSONIC SPEED, TURBOMACHINE BLADES, VELOCITY DISTRIBUTION

**N81-22018\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**NUMERICAL SIMULATION OF STEADY SUPERSONIC FLOW**

L. B. SCHIFF and J. L. STEGER May 1981 42 p refs  
 (NASA-TP-1749; A-7923) Avail: NTIS HC A03/MF A01  
 CSCL 01A

FINITE DIFFERENCE THEORY, NAVIER-STOKES EQUATION, SPATIAL MARCHING, STEADY FLOW, SUPERSONIC FLOW, VISCOUS FLOW

**N81-22019\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SOLUTION OF COMPLEX NONLINEAR PROBLEMS BY A GENERALIZED APPLICATION OF THE METHOD OF BASE AND COMPARISON SOLUTIONS WITH APPLICATIONS TO AERODYNAMICS PROBLEMS**

R. L. BARGER May 1981 29 p refs  
 (NASA-TP-1857; L-14197) Avail: NTIS HC A03/MF A01  
 CSCL 01A

AERODYNAMIC CONFIGURATIONS, APPROXIMATION, COMPUTATIONAL FLUID DYNAMICS, NONLINEAR SYSTEMS

**N81-24022\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DESIGN AND EXPERIMENTAL RESULTS FOR A NATURAL-LAMINAR-FLOW AIRFOIL FOR GENERAL AVIATION APPLICATIONS**

D. M. SOMERS Jun. 1981 104 p refs  
 (NASA-TP-1861; L-14117) Avail: NTIS HC A06/MF A01  
 CSCL 01A

DRAG, LAMINAR FLOW AIRFOILS, LEADING EDGES, LIFT

**N81-25040\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND ANALYTICAL STUDY OF THE LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF ANALYTICALLY AND EMPIRICALLY DESIGNED STRAKE-WING CONFIGURATIONS AT SUBCRITICAL SPEEDS**

J. E. LAMAR and N. T. FRINK Jun. 1981 226 p refs  
 (NASA-TP-1803; L-14041) Avail: NTIS HC A11/MF A01  
 CSCL 01A

AERODYNAMIC CHARACTERISTICS, NOSE FINNS, SUBCRITICAL FLOW, TRAPEZOIDAL WINGS

**N81-26078\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A PROCEDURE FOR DESIGNING FOREBODIES WITH CONSTRAINTS ON CROSS-SECTION SHAPE AND AXIAL AREA DISTRIBUTION**

R. L. BARGER Jul. 1981 14 p refs  
 (NASA-TP-1881; L-14516) Avail: NTIS HC A02/MF A01  
 CSCL 01A

AIRCRAFT DESIGN, FOREBODIES, PRESSURE DISTRIBUTION, SHAPES, STREAMLINED BODIES

**N81-29095\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND THEORETICAL SUPERSONIC LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS OF A SIMPLIFIED WING-BODY CONFIGURATION WITH A SERIES OF VERTICAL-TAIL ARRANGEMENTS**

M. LAMB, W. C. SAWYER, and J. L. THOMAS Aug. 1981 47 p refs  
 (NASA-TP-1878; L-14328) Avail: NTIS HC A03/MF A01  
 CSCL 01A

AERODYNAMIC STABILITY, BODY-WING AND TAIL CONFIGURATIONS, DIRECTIONAL STABILITY, LATERAL STABILITY, TAIL ASSEMBLIES

**N81-29096\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A THEORY FOR PREDICTING BOUNDARY IMPEDANCE AND RESONANCE FREQUENCIES OF SLOTTED-WALL WIND TUNNELS, INCLUDING PLENUM EFFECTS**

R. L. BARGER Jul. 1981 22 p refs  
 (NASA-TP-1880; L-14480) Avail: NTIS HC A02/MF A01  
 CSCL 01A

ACOUSTIC IMPEDANCE, PLENUM CHAMBERS, RESONANT FREQUENCIES, SLOTTED WIND TUNNELS, WIND TUNNEL WALLS

**N81-29098\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC TESTS AND ANALYSIS OF A TURBOJET-BOOSTED LAUNCH VEHICLE CONCEPT (SPACEJET) OVER A MACH NUMBER RANGE OF 1.50 TO 2.86**

G. D. RIEBE, W. J. SMALL, and O. A. MORRIS Jul. 1981 55 p refs  
 (NASA-TP-1888; L-14509) Avail: NTIS HC A04/MF A01

AERODYNAMIC CHARACTERISTICS, SPACE SHUTTLE BOOSTERS, SPACE TRANSPORTATION SYSTEM, TURBOJET ENGINES, WIND TUNNEL TESTS

## 02 AERODYNAMICS

**N81-30086\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF SIMULATED IN-FLIGHT THRUST REVERSING ON VERTICAL-TAIL LOADS OF F-18 AND F-15 AIRPLANE MODELS**

E. A. BARE, B. L. BERRIER, and F. J. CAPONE Aug. 1981 53 p refs

(NASA-TP-1890; L-14531) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, F-15 AIRCRAFT, F-18 AIRCRAFT, THRUST LOADS, THRUST REVERSAL

**N81-30087\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WING-ALONE AERODYNAMIC CHARACTERISTICS FOR HIGH ANGLES OF ATTACK OF SUPERSONIC SPEEDS**

R. L. STALLINGS, JR. and M. LAMB Jul. 1981 190 p refs

(NASA-TP-1889; L-14546) Avail: NTIS HC A09/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, ANGLE OF ATTACK, SUPERSONIC SPEED, WINGS

**N81-30088\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPUTER ANALYSIS OF FLOW PERTURBATIONS GENERATED BY PLACEMENT OF CHOKE BUMPS IN A WIND TUNNEL**

R. L. CAMPBELL Aug. 1981 44 p refs

(NASA-TP-1892; L-14415) Avail: NTIS HC A03/MF A01 CSCL 01A

CHOKES (RESTRICTIONS), COMPUTER PROGRAMS, FLOW DISTORTION, WIND TUNNELS

**N81-31128\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**GRID30: COMPUTER PROGRAM FOR FAST GENERATION OF MULTILEVEL, THREE-DIMENSIONAL BOUNDARY-CONFORMING O-TYPE COMPUTATIONAL GRIDS**

D. S. DULIKRAVICH Sep. 1981 14 p refs

(NASA-TP-1920; E-590) Avail: NTIS HC A02/MF A01 CSCL 01A

AIRCRAFT, BOUNDARY LAYER FLOW, COMPUTER PROGRAMS, FLUID FLOW, GEOMETRY, ROTORS, WINGS

**N81-31129\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SURROGATE-EQUATION TECHNIQUE FOR SIMULATION OF STEADY INVISCID FLOW Final Report**

G. M. JOHNSON Washington NASA Sep. 1981 40 p refs

(NASA-TP-1866; E-583) Avail: NTIS HC A03/MF A01 CSCL 01A

EULER EQUATIONS OF MOTION, FINITE DIFFERENCE THEORY, INVISCID FLOW, ITERATIVE SOLUTION, MATHEMATICAL MODELS

**N81-31130\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HIGH REYNOLDS NUMBER RESEARCH - 1980**

L. W. MCKINNEY, ed. and D. D. BAALS, ed. (Joint Inst. for Advancement of Flight Sciences, Hampton, Va.) Sep. 1981 315 p refs Workshop held at Hampton, Va., 9-11 Dec. 1980

(NASA-CP-2183; L-14416) Avail: NTIS HC A14/MF A01 CSCL 01A

AERODYNAMIC COEFFICIENTS, AERODYNAMIC CONFIGURATIONS, BOUNDARY LAYER FLOW, CONFERENCES, REYNOLDS NUMBER

**N82-11032\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SOME OBSERVATIONS ON A NEW NUMERICAL METHOD FOR SOLVING NAVIER-STOKES EQUATIONS**

A. KUMAR Nov. 1981 19 p refs

(NASA-TP-1934; L-14746) Avail: NTIS HC A02/MF A01 CSCL 01A

COMPUTER PROGRAMS, FINITE DIFFERENCE THEORY, NAVIER-STOKES EQUATION, TWO DIMENSIONAL FLOW

**N82-11033\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL RESULTS FOR A MODIFIED 17-PERCENT-THICK LOW-SPEED AIRFOIL SECTION**

R. J. MCGHEE and W. D. BEASLEY Nov. 1981 87 p refs

(NASA-TP-1919; L-14666) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC COEFFICIENTS, AIRFOIL PROFILES, LOW SPEED STABILITY, TURBULENT FLOW, WIND TUNNEL TESTS

**N82-12035\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DESCRIPTION AND CALIBRATION OF THE LANGLEY UNITARY PLAN WIND TUNNEL**

C. M. JACKSON, JR., W. A. CORLETT, and W. J. MONTA Nov. 1981 104 p refs

(NASA-TP-1905; L-14024) Avail: NTIS HC A06/MF A01 CSCL 01A

BOUNDARY LAYERS, FLOW CHARACTERISTICS, MACH NUMBER, SUPERSONIC WIND TUNNELS, TURBULENCE, WIND TUNNEL CALIBRATION

**N82-13106\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FORCE AND MOMENT, FLOW-VISUALIZATION, AND BOUNDARY-LAYER TESTS ON A SHUTTLE ORBITER MODEL AT MACH 6**

R. L. CALLOWAY Dec. 1981 25 p refs

(NASA-TP-1952; L-14782) Avail: NTIS HC A02/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, ANGLE OF ATTACK, BOUNDARY LAYER FLOW, CONTROL SURFACES, REYNOLDS NUMBER, SPACE SHUTTLE ORBITERS

**N82-13107\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF BLADE TIP GEOMETRY ON THE INTERACTION OF TORSIONAL LOADS AND PERFORMANCE FOR AN ARTICULATED HELICOPTER ROTOR**

W. T. YEAGER and W. R. MANTAY Dec. 1981 64 p refs

Prepared in cooperation with Army Aviation Research and Development Command, Hampton, Va.

(DA PROJ. 1L2-62209-AH-76)

(NASA-TP-1926; AVRADCOM-TR-81-B-5; L-14674) Avail: NTIS

HC A04/MF A01 CSCL 01A

AIRFOIL PROFILES, BLADE TIPS, ROTARY WINGS, ROTOR

AERODYNAMICS, TORSION, WIND TUNNEL TESTS

**N82-13108\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**CROSSFLOW EFFECTS ON STEADY AND FLUCTUATING PRESSURES ON AN OGIVE-CYLINDER CONE-FRUSTUM MODEL IN SUPERSONIC SEPARATED FLOW**

J. B. DODS, JR. (Raman Aeronautics Research and Engineering, Inc., Palo Alto, Calif.) and C. F. COE Nov. 1981 58 p refs

(NAS2-10139) (NASA-TP-1951; A-8563) Avail: NTIS HC A04/MF A01 CSCL 01A

CROSS FLOW, CYLINDRICAL BODIES, FLOW THEORY, FRUSTUMS, OGIVES, PRESSURE GRADIENTS, SEPARATED FLOW, SUPERSONIC FLOW, WIND TUNNEL TESTS

**N82-14051\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYTIC INVESTIGATION OF EFFECT OF END-WALL CONTOURING ON STATOR PERFORMANCE**

R. J. BOYLE, H. E. RHOLIK, and L. J. GOLDMAN Nov. 1981 12 p refs

(NASA-TP-1943; E-719) Avail: NTIS HC A02/MF A01 CSCL 01A

AERODYNAMIC LOADS, BLADE TIPS, CONTOURS, STATOR BLADES, STATORS, TURBINES, WALL FLOW

**N82-14052\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF AXISYMMETRIC SUPERSONIC CRUISE NOZZLE GEOMETRY AT MACH NUMBERS FROM 0.60 TO 1.30**

G. T. CARSON, JR. and E. E. LEE, JR. Dec. 1981 89 p refs (NASA-TP-1953; L-14661) Avail: NTIS HC A04/MF A01 CSCL 01A

AXISYMMETRIC FLOW, BOATTAILS, CONVERGENT-DIVERGENT NOZZLES, MACH NUMBER, NOZZLE DESIGN, NOZZLE GEOMETRY, SUPERSONIC AIRCRAFT

**N82-14055\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPARISON OF EXPERIMENTAL AND THEORETICAL TURBULENCE REDUCTION CHARACTERISTICS FOR SCREENS, HONEYCOMB, AND HONEYCOMB-SCREEN COMBINATIONS**

J. SCHEIMAN Dec. 1981 55 p refs

(NASA-TP-1958; L-14628) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC DRAG, DECELERATION, DRAG REDUCTION, HONEYCOMB STRUCTURES, TURBULENCE EFFECTS

**N82-15015\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED AERODYNAMIC PERFORMANCE OF A HIGH-ASPECT-RATIO SUPERCRITICAL-WING TRANSPORT MODEL EQUIPPED WITH FULL-SPAN SLAT AND PART-SPAN DOUBLE-SLOTTED FLAPS**

H. L. MORGAN, JR. and J. W. PAULSON, JR. Dec. 1979 145 p refs

(NASA-TP-1580; L-13201) Avail: NTIS HC A07/MF A01 CSCL 01A

AERODYNAMIC COEFFICIENTS, ASPECT RATIO, LOW SPEED, SUPERCRITICAL WINGS

**N82-20149\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LAMINAR FLOW CONTROL. THE RESEARCH AND TECHNOLOGY STUDIES 1981**

D. V. MADDALON, ed. Mar. 1982 135 p refs Proceedings of Conf. held at Dryden Flight Research Center, Edwards, Calif., 17-18 Sep. 1981

(NASA-CP-2218; NAS 1.55:2218; L-15084) Avail: NTIS HC A07/MF A01 CSCL 01A

AIRCRAFT CONSTRUCTION MATERIALS, BOUNDARY LAYER CONTROL, LAMINAR FLOW AIRFOILS, LEADING EDGE FLAPS, TRAILING-EDGE FLAPS

**N82-20156\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC INTERNAL PERFORMANCE OF SINGLE EXPANSION-RAMP NOZZLES WITH THRUST VECTORING AND REVERSING**

R. J. RE and B. L. BERRIER Mar. 1982 143 p refs

(NASA-TP-1962; L-14902; NAS 1.60:1962) Avail: NTIS HC A07/MF A01 CSCL 01A

EXHAUST NOZZLES, NOZZLE FLOW, NOZZLE GEOMETRY, STATIC AERODYNAMIC CHARACTERISTICS, STATIC TESTS, THRUST REVERSAL, THRUST VECTOR CONTROL

**N82-22215\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF AXISYMMETRIC AND NORMAL AIR JET PLUMES AND SOLID PLUME ON CYLINDRICAL AFTERBODY PRESSURE DISTRIBUTIONS AT MACH NUMBERS FROM 1.65 TO 2.50**

P. F. COVELL Apr. 1982 35 p refs

(NASA-TP-2005; L-14883; NAS 1.60:2005) Avail: NTIS HC A03/MF A01 CSCL 01A

AFTERBODIES, AIR JETS, AXISYMMETRIC FLOW, FLOW DISTRIBUTION, MACH NUMBER, PLUMES, PRESSURE DISTRIBUTION, WIND TUNNEL TESTS

**N82-25193\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN ANALYTICAL PROCEDURE FOR COMPUTING SMOOTH TRANSITIONS BETWEEN TWO SPECIFIED CROSS SECTIONS WITH APPLICATIONS TO BLENDED WING BODY CONFIGURATION**

R. L. BARGER May 1982 20 p refs

(NASA-TP-2012; L-15053; NAS 1.60:2012) Avail: NTIS HC A02/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, BODY-WING CONFIGURATIONS, COMPUTER SYSTEMS DESIGN, MISSILE CONFIGURATIONS, MISSILE DESIGN

**N82-25196\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL/FLIGHT CORRELATION, 1981**

L. W. MCKINNEY, ed. and D. D. BAALS, ed. Jun. 1982 224 p refs Workshop held at Hampton, Va., 19-20 Nov. 1981

(NASA-CP-2225; L-15368; NAS 1.55:2225) Avail: NTIS HC A10/MF A01 CSCL 14B

CONFERENCES, DATA CORRELATION, FLIGHT TESTS, SPACE SHUTTLE ORBITERS, SUPERSONIC WIND TUNNELS, TRANSONIC WIND TUNNELS, WIND TUNNEL APPARATUS, WIND TUNNEL TESTS, WIND TUNNEL WALLS

**N82-26227\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**IN-FLIGHT TRANSITION MEASUREMENT ON A 10 DEG CONE AT MACH NUMBERS FROM 0.5 TO 2.0**

D. F. FISHER and N. S. DOUGHERTY, JR. Jun. 1982 143 p refs

(NASA-TP-1971; H-1117; NAS 1.60:1971) Avail: NTIS HC A07/MF A01 CSCL 01A

BOUNDARY LAYER TRANSITION, F-15 AIRCRAFT, FLOW MEASUREMENT, IN-FLIGHT MONITORING, MACH NUMBER, NOSE CONES, SLENDER CONES

**N82-26231\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PERFORMANCE CHARACTERISTICS OF AXISYMMETRIC CONVERGENT-DIVERGENT EXHAUST NOZZLES WITH LONGITUDINAL SLOTS IN THE DIVERGENT**

L. D. LEAVITT and L. S. BANGERT Jun. 1982 36 p refs

(NASA-TP-2013; L-15119; NAS 1.60:2013) Avail: NTIS HC A03/MF A01 CSCL 01A

CONVERGENT-DIVERGENT NOZZLES, FLAPS (CONTROL SURFACES), NOZZLE GEOMETRY, VENTILATION

**N82-26232\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF AN ELLIPTICAL BODY WITH A HORIZONTAL TAIL AT MACH NUMBERS FROM 2.3 TO 4.63**

B. L. SHROUT and A. W. ROBINS (Kentron International, Inc.) Jun. 1982 39 p refs

(NASA-TP-2024; NAS 1.60:2024) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, HORIZONTAL TAIL SURFACES, LIFT DRAG RATIO

## 02 AERODYNAMICS

**N82-26234\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**LASER ANEMOMETER MEASUREMENTS IN AN ANNULAR CASCADE OF CORE TURBINE VANES AND COMPARISON WITH THEORY**

L. J. GOLDMAN and R. G. SEASHULTZ Jun. 1982 47 p refs  
 (NASA-TP-2018; E-876; NAS 1.60:2018) Avail: NTIS HC  
 A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, ANNULAR FLOW, LASER ANEMOMETERS, STATOR BLADES, TURBINE BLADES

**N82-26235\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC INTERNAL PERFORMANCE CHARACTERISTICS OF TWO THRUST REVERSER CONCEPTS FOR AXISYMMETRIC NOZZLES**

L. D. LEAVITT and R. J. RE Jun. 1982 24 p refs  
 (NASA-TP-2025; NAS 1.60:2025) Avail: NTIS HC A02/MF A01 CSCL 01A

AXISYMMETRIC BODIES, EXHAUST NOZZLES, THRUST REVERSAL, TURBINE BLADES

**N82-28247\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPUTER PROGRAM FOR CALCULATING FULL POTENTIAL TRANSONIC, QUASI-THREE-DIMENSIONAL FLOW THROUGH A ROTATING TURBOMACHINERY BLADE ROW**

C. A. FARRELL Jun. 1982 57 p refs  
 (NASA-TP-2030; E-1013; NAS 1.60:2030) Avail: NTIS HC  
 A04/MF A01 CSCL 01A

CASCADE FLOW, COMPUTATIONAL FLUID DYNAMICS, COMPUTER PROGRAMS, FLOW EQUATIONS, POTENTIAL FLOW, THREE DIMENSIONAL FLOW, TRANSONIC FLOW, TURBOMACHINE BLADES

**N82-29270\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**VELOCITY GRADIENT METHOD FOR CALCULATING VELOCITIES IN AN AXISYMMETRIC ANNULAR DUCT**

T. KATSANIS Jul. 1982 23 p refs  
 (NASA-TP-2029; E-1104; NAS 1.60:2029) Avail: NTIS HC  
 A02/MF A01 CSCL 01A

ANNULAR DUCTS, DUCTED FLOW, FLOW VELOCITY, VELOCITY DISTRIBUTION, WALL FLOW

**N82-30291\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AEROPROPULSIVE CHARACTERISTICS OF MACH NUMBERS UP TO 2.2 OF AXISYMMETRIC AND NONAXISYMMETRIC NOZZLES INSTALLED ON AN F-18 MODEL**

F. J. CAPONE Aug. 1982 80 p refs  
 (NASA-TP-2044; L-15208; NAS 1.60:2044) Avail: NTIS HC  
 A05/MF A01 CSCL 01A

AXISYMMETRIC BODIES, CONVERGENT-DIVERGENT NOZZLES, F-18 AIRCRAFT, MACH NUMBER, NOZZLE GEOMETRY

**N82-32320\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF NOZZLE AND VERTICAL-TAIL VARIABLES ON THE PERFORMANCE OF A 3-SURFACE F-15 MODEL AT TRANSONIC MACH NUMBERS**

O. C. PENDERGRAFT, JR. and E. A. BARE Aug. 1982 171 p  
 (NASA-TP-2043; L-15304; NAS 1.60:2043) Avail: NTIS HC  
 A08/MF A01 CSCL 01A

CONTROL STABILITY, F-15 AIRCRAFT, LONGITUDINAL STABILITY, NOZZLE GEOMETRY, TAIL ASSEMBLIES, THRUST REVERSAL, TRANSONIC SPEED

**N82-32322\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL INVESTIGATION OF TWO NONAXISYMMETRIC WEDGE NOZZLES AT FREE STREAM MACH NUMBERS UP TO 1.20**

M. L. MASON and W. K. ABEYOUNIS Sep. 1982 117 p refs  
 (NASA-TP-2054; L-15276; NAS 1.60:2054) Avail: NTIS HC  
 A06/MF A01 CSCL 01A

FREE FLOW, MACH NUMBER, NOZZLE FLOW, NOZZLE GEOMETRY, WEDGES

**N83-10016\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THICK WINGS AT VARIOUS SWEEP ANGLES IN AND OUT OF GROUND EFFECT**

J. W. PAULSON, JR. and S. O. KJELGAARD Oct. 1982 165 p refs  
 (NASA-TP-2068; L-15314; NAS 1.60:2068) Avail: NTIS HC  
 A08/MF A01 CSCL 01A

GROUND EFFECT (AERODYNAMICS), LONGITUDINAL STABILITY, SPANLOADER AIRCRAFT, SWEEP ANGLE, WIND TUNNEL TESTS, WING PROFILES

**N83-11058\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF A TANDEM-ROTOR/TANDEM-STATOR CONICAL-FLOW COMPRESSOR DESIGNED FOR A PRESSURE RATIO OF 3**

J. R. WOOD, A. K. OWEN (Army Aviation Research and Development Command, Cleveland, Ohio), and L. F. SCHUMANN (Army Aviation Research and Development Command, Cleveland, Ohio) Oct. 1982 38 p refs  
 (NASA-TP-2034; E-369; NAS 1.60:2034; AVRADCOM-TR-81-C-5) Avail: NTIS HC A03/MF A01 CSCL 01A

COMPRESSORS, CONICAL FLOW, GAS TURBINE ENGINES, PRESSURE RATIO, ROTORS, STATORS

**N83-11059\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF INSTALLATION EFFECTS OF SINGLE-ENGINE CONVERGENT-DIVERGENT NOZZLES**

J. R. BURLEY, II and B. L. BERRIER Nov. 1982 234 p refs  
 (NASA-TP-2078; L-15343; NAS 1.60:2078) Avail: NTIS HC  
 A11/MF A01 CSCL 01A

AERODYNAMIC DRAG, CONVERGENT-DIVERGENT NOZZLES, WIND TUNNEL TESTS

**N83-16290\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A 17-PERCENT-THICK MEDIUM SPEED AIRFOIL DESIGNED FOR GENERAL AVIATION APPLICATIONS**

R. J. MCGHEE and W. D. BEASELEY Dec. 1980 87 p refs  
 (NASA-TP-1786; L-13900; NAS 1.60:1786) Avail: NTIS HC  
 A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AIRFOIL PROFILES, AIRFOILS, GENERAL AVIATION AIRCRAFT, LOW SPEED, WIND TUNNEL TESTS

**N83-22161\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AEROPROPULSIVE CHARACTERISTICS OF TWIN SINGLE-EXPANSION-RAMP VECTORING NOZZLES INSTALLED WITH FORWARD-SWEPT WINGS AND CANARDS**

M. L. MASON and F. J. CAPONE Mar. 1983 76 p refs  
 (NASA-TP-2133; L-15555; NAS 1.60:2133) Avail: NTIS HC  
 A05/MF A01 CSCL 01A

BODY-WING CONFIGURATIONS, CANARD CONFIGURATIONS, NOZZLE THRUST COEFFICIENTS, SWEEPED FORWARD WINGS, THRUST VECTOR CONTROL, WIND TUNNEL TESTS



**N83-22162\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL STUDY OF WING LEADING-EDGE DEVICES FOR IMPROVED MANEUVER PERFORMANCE OF A SUPERCRITICAL MANEUVERING FIGHTER CONFIGURATION**

M. J. MANN, J. K. HUFFMAN, C. H. FOX, JR., and R. L. CAMPBELL Mar. 1983 84 p refs  
(NASA-TP-2125; L-15539; NAS 1.60:2125) Avail: NTIS HC A05/MF A01 CSCL 01A

FIGHTER AIRCRAFT, LEADING EDGE FLAPS, MANEUVERABILITY, SUPERCRITICAL WINGS, VORTEX GENERATORS, WIND TUNNEL TESTS

**N83-22166\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**A COMMON GEOMETRIC DATA-BASE APPROACH FOR COMPUTER-AIDED MANUFACTURING OF WIND-TUNNEL MODELS AND THEORETICAL AERODYNAMIC ANALYSIS**

M. J. SEE (Kansas Univ., Lawrence) and J. V. COZZOLONGO Apr. 1983 27 p refs  
(NASA-TP-2151; A-9169; NAS 1.60:2151) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AIRCRAFT CONFIGURATIONS, COMPUTER AIDED MANUFACTURING, WIND TUNNEL MODELS

**N83-24478\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF TWIN-VERTICAL-TAIL PARAMETERS ON TWIN-ENGINE AFTERBODY/NOZZLE AERODYNAMIC CHARACTERISTICS**

L. D. LEAVITT and E. A. BARE May 1983 106 p refs  
(NASA-TP-2158; L-15570; NAS 1.60:2158) Avail: NTIS HC A06/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AFTERBODIES, ENGINE AIRFRAME INTEGRATION, NOZZLES, TAIL ASSEMBLIES, WIND TUNNEL TESTS

**N83-25665\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**PRESSURES MEASURED IN FLIGHT ON THE AFT FUSELAGE AND EXTERNAL NOZZLE OF A TWIN-JET FIGHTER**

J. NUGENT, T. J. PLANT, R. A. DAVIS, and N. V. TAILLON May 1983 90 p refs  
(NASA-TP-2017; H-1161; NAS 1.60:2017) Avail: NTIS HC A05/MF A01 CSCL 01A

BOUNDARY LAYERS, FIGHTER AIRCRAFT, FUSELAGES, NOZZLE FLOW, NOZZLE GEOMETRY, PRESSURE MEASUREMENT

**N83-25666\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF EMPENNAGE LOCATION ON TWIN-ENGINE AFTERBODY-NOZZLE AERODYNAMIC CHARACTERISTICS AT MACH NUMBERS FROM 0.6 TO 1.2**

L. D. LEAVITT May 1983 223 p refs  
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AERODYNAMIC CHARACTERISTICS, AFTERBODIES, AIRCRAFT CONFIGURATIONS, NOZZLE GEOMETRY, TAIL ASSEMBLIES, WIND TUNNEL TESTS

**N83-26821\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF VARYING PODDED NACELLE-NOZZLE INSTALLATIONS ON TRANSONIC AEROPROPULSIVE CHARACTERISTICS OF A SUPERSONIC FIGHTER AIRCRAFT**

F. J. CAPONE and D. E. REUBUSH May 1983 337 p refs  
(NASA-TP-2120; L-15525; NAS 1.60:2120) Avail: NTIS HC A15/MF A01 CSCL 01A

FIGHTER AIRCRAFT, NACELLES, NOZZLE DESIGN, PROPULSION SYSTEM PERFORMANCE, SUPERSONIC FLIGHT, SUPERSONIC NOZZLES

**N83-27959\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF TAIL-FIN SPAN ON STABILITY AND CONTROL CHARACTERISTICS OF A CANARD-CONTROLLED MISSILE AT SUPERSONIC MACH NUMBERS**

A. B. BLAIR, JR., J. M. ALLEN, and G. HERNANDEZ Jun. 1983 86 p refs  
(NASA-TP-2157; L-15586; NAS 1.60:2157) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, MISSILE CONFIGURATIONS, SUPERSONICS

**N83-30386\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DESIGN AND EXPERIMENTAL RESULTS FOR A FLAPPED NATURAL-LAMINAR-FLOW AIRFOIL FOR GENERAL AVIATION APPLICATIONS**

D. M. SOMERS Jun. 1981 125 p refs  
(NASA-TP-1865; L-14409; NAS 1.60:1865) Avail: NTIS HC A06/MF A01 CSCL 01A

AIRFOILS, FLAPS (CONTROL SURFACES), LAMINAR FLOW

**N83-30389\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL INVESTIGATION OF A 10-PERCENT-THICK HELICOPTER ROTOR AIRFOIL SECTION DESIGNED WITH A VISCOUS TRANSONIC ANALYSIS CODE**

K. W. NOONAN Jul. 1981 78 p refs  
(DA PROJ. 1L1-61102-AH-45)  
(NASA-TP-1864; L-14182; NAS 1.60:1864; AVRADCOM-TR-81-B-3) Avail: NTIS HC A05/MF A01 CSCL 01A

AIRFOIL PROFILES, HELICOPTER DESIGN, ROTARY WINGS, TRANSONIC SPEED, VISCOUS FLOW

**N83-30390\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED AERODYNAMIC PERFORMANCE OF AN ASPECT-RATIO-10 SUPERCRITICAL-WING TRANSPORT MODEL EQUIPPED WITH A FULL-SPAN SLAT AND PART-SPAN AND FULL-SPAN DOUBLE-SLOTTED FLAPS**

H. L. MORGAN, JR. Apr. 1981 183 p refs  
(NASA-TP-1805; L-13825; NAS 1.60:1805) Avail: NTIS HC A09/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, LEADING EDGE SLATS, SUPERCRITICAL WINGS, WING FLAPS

**N83-30391\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WALL-TEMPERATURE EFFECTS ON THE AERODYNAMICS OF A HYDROGEN-FUELED TRANSPORT CONCEPT IN MACH 8 BLOWDOWN AND SHOCK TUNNELS**

J. A. PENLAND, D. C. MARCUM, JR., and S. H. STACK Jul. 1983 61 p refs  
(NASA-TP-2159; L-15100; NAS 1.60:2159) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, BOUNDARY LAYER FLOW, HYPERSONIC AIRCRAFT, WALL TEMPERATURE, WIND TUNNEL TESTS

**N83-31577\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL INVESTIGATION OF LEADING-EDGE THRUST ON ARROW WINGS IN SUPERSONIC FLOW**

R. J. MACK Aug. 1983 80 p refs  
(NASA-TP-2167; L-15535; NAS 1.60:2167) Avail: NTIS HC A05/MF A01 CSCL 01A

AIRFOILS, BLUNT BODIES, LEADING EDGES, SUPERSONIC FLOW, WIND TUNNEL TESTS

## 02 AERODYNAMICS

**N83-32774\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPARISON OF TWO- AND THREE-DIMENSIONAL FLOW COMPUTATIONS WITH LASER ANEMOMETER MEASUREMENTS IN A TRANSONIC COMPRESSOR ROTOR**

R. V. CHIMA and A. J. STRAZISAR Sep. 1982 21 p refs  
Presented at ASME 27th Intern. Gas Turbine Conf., London, 18-22 Apr. 1982 Film supplement C-299 available

(NASA-TP-1931; E-1007; NAS 1.60:1931) Avail: NTIS HC A02/MF A01 CSCL 01A

COMPRESSOR ROTORS, EULER EQUATIONS OF MOTION, FLUID MECHANICS, MACH NUMBER, TURBOMACHINERY

**N83-32776\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORETICAL AND EXPERIMENTAL INVESTIGATION OF SUPERSONIC AERODYNAMIC CHARACTERISTICS OF A TWIN-FUSELAGE CONCEPT**

R. M. WOOD, D. S. MILLER, and K. S. BRENTNER Aug. 1983 39 p refs

(NASA-TP-2184; L-15607; NAS 1.61:2184) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, COMPUTER PROGRAMS, PREDICTIONS, SUPERSONIC TRANSPORTS, WIND TUNNEL TESTS

**N83-34904\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS OF A SERIES OF BODIES WITH VARIATIONS IN NOSE CAMBER**

B. L. SHROUT and P. F. COVELL Sep. 1983 55 p refs  
(NASA-TP-2206; L-15647; NAS 1.60:2206) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AERODYNAMIC CONFIGURATIONS, CAMBER, FOREBODIES, WIND TUNNEL TESTS

**N83-34905\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL INVESTIGATION OF LEADING-EDGE THRUST AT SUPERSONIC SPEEDS**

R. M. WOOD and D. S. MILLER Sep. 1983 52 p refs  
(NASA-TP-2204; L-15620; NAS 1.60:2204) Avail: NTIS HC A04/MF A01 CSCL 01A

JET THRUST, LEADING EDGES, SUPERSONIC SPEED, WING PLANFORMS

**N83-34906\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**EXPERIMENTS IN A THREE-DIMENSIONAL ADAPTIVE-WALL WIND TUNNEL**

E. T. SCHAIRER Sep. 1983 33 p refs  
(NASA-TP-2210; A-9255; NAS 1.60:2210) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC INTERFERENCE, DATA ACQUISITION, TWO DIMENSIONAL FLOW, WIND TUNNEL TESTS, WIND TUNNEL WALLS

**N83-36000\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A HIGHLY SWEPT, UNTWISTED UNCAMBERED ARROW WING**

P. L. COE, JR., S. O. KJELGAARD, and G. L. GENTRY, JR. Oct. 1983 70 p refs  
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AERODYNAMIC CHARACTERISTICS, ARROW WINGS, SWEPT WINGS, UNCAMBERED WINGS

**N84-10025\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF THRUST VECTORING AND WING MANEUVER DEVICES ON TRANSONIC AEROPROPULSIVE CHARACTERISTICS OF A SUPERSONIC FIGHTER**

F. J. CAPONE and D. E. REUBUSH Feb. 1983 88 p refs  
(NASA-TP-2119; L-15526; NAS 1.60:2119) Avail: NTIS HC A05/MF A01 CSCL 01A

FIGHTER AIRCRAFT, MANEUVERABILITY, SUPERSONIC FLOW, THRUST VECTOR CONTROL, TRANSONIC FLOW, WINGS

**N84-13152\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF INSTALLATION EFFECTS ON TWIN-ENGINE CONVERGENT-DIVERGENT NOZZLES**

E. A. BARE and B. L. BERRIER Nov. 1983 191 p refs  
(NASA-TP-2205; L-15609; NAS 1.60:2205) Avail: NTIS HC A09/MF A01 CSCL 01A

CONVERGENT-DIVERGENT NOZZLES, SUPERSONIC CRUISE AIRCRAFT RESEARCH

**N84-13162\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC FORCE MEASUREMENTS WITH A STRAIN-GAGE BALANCE IN A CRYOGENIC WIND TUNNEL**

R. P. BOYDEN, W. G. JOHNSON, JR., and A. T. FERRIS Dec. 1983 43 p refs  
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AERODYNAMIC FORCES, CRYOGENIC WIND TUNNELS, STRAIN GAGES

**N84-13163\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THRUST-INDUCED EFFECTS ON SUBSONIC LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A VECTORED-ENGINE-OVER-WING CONFIGURATION**

P. F. QUINTO and J. W. PAULSON, JR. Dec. 1983 56 p refs  
(NASA-TP-2228; L-15629; NAS 1.60:2228) Avail: NTIS HC A04/MF A01 CSCL 01A

JET EXHAUST, PROPULSION SYSTEM CONFIGURATIONS, SHORT TAKEOFF AIRCRAFT, THRUST VECTOR CONTROL

**N84-13164\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS, INCLUDING EFFECT OF BODY SHAPE, OF A MACH 6 AIRCRAFT CONCEPT**

G. D. RIEBE Dec. 1983 32 p refs  
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AERODYNAMIC CHARACTERISTICS, HYDROGEN FUELS, HYPERSONIC AIRCRAFT, MACH NUMBER, TRANSPORT AIRCRAFT

**N84-13165\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF THRUST REVERSER OPERATION ON THE LATERAL-DIRECTIONAL CHARACTERISTICS OF A THREE-SURFACE F-15 MODEL AT TRANSONIC SPEEDS**

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F-15 AIRCRAFT, NOZZLE DESIGN, PROPULSION SYSTEM CONFIGURATIONS, RUDDERS, THRUST REVERSAL, WIND TUNNEL MODELS

**N84-17127\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WAVE DRAG AS THE OBJECTIVE FUNCTION IN TRANSONIC FIGHTER WING OPTIMIZATION**

P. S. PHILLIPS Feb. 1984 23 p refs  
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A02/MF A01 CSCL 01A

AIRCRAFT DESIGN, AIRCRAFT MANEUVERS, DRAG REDUCTION, FIGHTER AIRCRAFT, TRANSONIC FLIGHT, WAVE DRAG

**N84-17132\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORETICAL AND EXPERIMENTAL ENGINE-INLET FLOW FIELDS FOR FIGHTER FOREBODIES**

S. F. YAROS Feb. 1984 66 p refs  
(NASA-TP-2270; L-15639; NAS 1.60:2270) Avail: NTIS HC  
A04/MF A01 CSCL 01A

ENGINE INLETS, FIGHTER AIRCRAFT, FLOW DISTRIBUTION, FOREBODIES, INLET FLOW, PREDICTION ANALYSIS TECHNIQUES

**N84-18159\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AIRFOIL INTERACTION WITH IMPINGING VORTEX**

K. W. MCALISTER and C. TUNG Feb. 1984 86 p refs  
Prepared in cooperation with Army Aviation Systems Command, St. Louis, Mo.

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AIRFOILS, DRAG, LIFT, PITCHING MOMENTS, VORTICES

**N84-18161\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC DESIGN FOR IMPROVED MANEUVERABILITY BY USE OF THREE-DIMENSIONAL TRANSONIC THEORY**

M. J. MANN, R. L. CAMPBELL, and J. C. FERRIS Feb. 1984 72 p refs

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A04/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, MANEUVERABILITY, TRANSONIC FLOW

**N84-18162\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN EXPERIMENTAL INVESTIGATION OF NACELLE-PYLON INSTALLATION ON AN UNSWEPT WING AT SUBSONIC AND TRANSONIC SPEEDS**

J. R. CARLSON and W. B. COMPTON, III Feb. 1984 203 p refs

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A10/MF A01 CSCL 01A

AERODYNAMIC INTERFERENCE, NACELLES, SUPERCRITICAL WINGS, TRANSONIC SPEED, UNSWEPT WINGS

**N84-18163\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**BODY AND CANARD EFFECTS ON AN ATTACHED-FLOW MANEUVER WING AT MACH 1.62**

J. L. PITTMAN, D. S. MILLER, and W. H. MASON (Grumman Aerospace Corp., Bethpage, N.Y.) Feb. 1984 149 p refs  
(NASA-TP-2249; L-15677; NAS 1.60:2249) Avail: NTIS HC  
A07/MF A01 CSCL 01A

AIRCRAFT MANEUVERS, BODY-WING CONFIGURATIONS, CAMBERED WINGS, CANARD CONFIGURATIONS, CROSS FLOW, UNCAMBERED WINGS

**N84-18164\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF TRAILING-EDGE-FLAP, SPANWISE-BLOWING CONCEPTS ON AN ADVANCED FIGHTER CONFIGURATION**

J. W. PAULSON, JR., P. F. QUINTO, and D. W. BANKS Mar. 1984 107 p refs

(NASA-TP-2250; L-15627; NAS 1.60:2250) Avail: NTIS HC  
A06/MF A01 CSCL 01A

AIRCRAFT CONFIGURATIONS, FIGHTER AIRCRAFT, SPANWISE BLOWING, TRAILING EDGES

**N84-18165\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC INTERNAL PERFORMANCE INCLUDING THRUST VECTORING AND REVERSING OF TWO-DIMENSIONAL CONVERGENT-DIVERGENT NOZZLES**

R. J. RE and L. D. LEAVITT Feb. 1984 111 p refs  
(NASA-TP-2253; L-15671; NAS 1.60:2253) Avail: NTIS HC

A06/MF A01 CSCL 01A

CONVERGENT-DIVERGENT NOZZLES, NOZZLE GEOMETRY, PRESSURE RATIO, THRUST REVERSAL, THRUST VECTOR CONTROL

**N84-20480\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**GENERALIZATION OF THE SUBSONIC KERNEL FUNCTION IN THE S-PLANE, WITH APPLICATIONS TO FLUTTER ANALYSIS**

H. J. CUNNINGHAM and R. N. DESMARIS Mar. 1984 39 p refs

(NASA-TP-2292; L-15708; NAS 1.60:2292) Avail: NTIS HC  
A03/MF A01 CSCL 01A

AERODYNAMIC FORCES, AEROELASTICITY, CONTROL THEORY, FLUTTER ANALYSIS, KERNEL FUNCTIONS, SUBSONIC FLUTTER

**N84-20486\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WING PLANFORM EFFECTS AT SUPERSONIC SPEEDS FOR AN ADVANCED FIGHTER CONFIGURATION**

R. M. WOOD and D. S. MILLER Mar. 1984 117 p refs  
(NASA-TP-2269; L-15706; NAS 1.60:2269) Avail: NTIS HC

A06/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AIRCRAFT CONFIGURATIONS, FIGHTER AIRCRAFT, SUPERSONIC AIRFOILS, WIND TUNNEL TEST, WING PLANFORMS

**N84-20493\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL INVESTIGATION OF TANGENTIAL BLOWING APPLIED TO A SUBSONIC V/STOL INLET**

R. R. BURLEY Apr. 1984 20 p refs

(NASA-TP-2297; E-1907; NAS 1.60:2297) Avail: NTIS HC  
A02/MF A01 CSCL 01A

ANGLE OF ATTACK, BOUNDARY LAYER CONTROL, ENGINE INLETS, SPANWISE BLOWING

**N84-24538\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AEROPROPULSIVE CHARACTERISTICS OF NONAXISYMMETRIC-NOZZLE THRUST REVERSERS AT MACH NUMBERS FROM 0 TO 1.20**

G. T. CARSON, JR., F. J. CAPONE, and M. L. MASON May 1984 126 p refs

(NASA-TP-2306; L-15724; NAS 1.60:2306) Avail: NTIS HC  
A07/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, FIGHTER AIRCRAFT, NOZZLE FLOW, NOZZLE GEOMETRY, THRUST REVERSAL

## 02 AERODYNAMICS

**N84-26660\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **NATURAL LAMINAR FLOW EXPERIMENTS ON MODERN AIRPLANE SURFACES**

B. J. HOLMES, C. J. OBARA (Kentrion International, Inc., Hampton, Va.), and L. P. YIP Jun. 1984 145 p refs

(NASA-TP-2256; L-15552; NAS 1.60:2256) Avail: NTIS HC

A07/MF A01 CSCL 01A

FLOW VISUALIZATION, GENERAL AVIATION AIRCRAFT, LAMINAR BOUNDARY LAYER, LAMINAR FLOW, VELOCITY DISTRIBUTION, WIND TUNNEL TESTS

**N84-27674\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

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S. HOFFMAN Jul. 1984 56 p

(NASA-RP-1117; L-15740; NAS 1.61:1117) Avail: NTIS HC

A04/MF A01 CSCL 01A

A bibliography for the Supersonic Cruise Research (SCR) and Variable Cycle Engine (VCE) Programs is presented. An annotated bibliography for the last 123 formal reports and a listing of titles for 44 articles and presentations is included. The studies identifies technologies for producing efficient supersonic commercial jet transports for cruise Mach numbers from 2.0 to 2.7. M.A.C.

**N84-27675\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **RECENT MODIFICATIONS AND CALIBRATION OF THE LANGLEY LOW-TURBULENCE PRESSURE TUNNEL**

R. J. MCGHEE, W. D. BEASLEY, and J. M. FOSTER 1984 65 p refs

(NASA-TP-2328; L-15728; NAS 1.60:2328) Avail: NTIS HC

A04/MF A01 CSCL 01A

FLOW CHARACTERISTICS, LAMINAR FLOW, LOW SPEED WIND TUNNELS, LOW TURBULENCE, REVISIONS, WIND TUNNEL APPARATUS, WIND TUNNEL CALIBRATION

**N84-27676\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EFFECT OF FUSELAGE UPWASH ON THE SUPERSONIC LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF 2 FIGHTER CONFIGURATIONS**

R. M. WOOD and D. S. MILLER Jul. 1984 61 p refs

(NASA-TP-2330; L-15758; NAS 1.60:2330) Avail: NTIS HC

A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, FIGHTER AIRCRAFT, FUSELAGES, LINEARITY, SUPERSONIC AIRCRAFT, UPWASH

**N84-27682\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **VISCOUS-INVISCID INTERACTION METHOD INCLUDING WAKE EFFECTS FOR THREE-DIMENSIONAL WING-BODY CONFIGURATIONS**

C. L. STRETT Sep. 1981 30 p refs Presented at AIAA 14th Fluid and Plasma Dyn. Conf., Palo Alto, Calif., 22-24 Jun. 1981

(NASA-TP-1910; L-14053; NAS 1.60:1910; AIAA-81-1266) Avail:

NTIS HC A03/MF A01 CSCL 01A

FINITE DIFFERENCE THEORY, INVISCID FLOW, THREE DIMENSIONAL BOUNDARY LAYER, VISCOUS FLOW

**N84-27688\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### **KC-135 WINGLET PROGRAM REVIEW**

Washington Jan. 1982 193 p refs Symp. held in Edwards, Calif., 16 Sep. 1981

(NASA-CP-2211; H-1165; NAS 1.55:2211) Avail: NTIS HC

A09/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AERODYNAMIC LOADS, AIRCRAFT PERFORMANCE, C-135 AIRCRAFT, CONFERENCES, FLIGHT TESTS, FLUTTER, FUEL CONSUMPTION, WIND TUNNEL TESTS, WINGLETS

**N84-27694\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **TWO-DIMENSIONAL AERODYNAMIC CHARACTERISTICS OF AN AIRFOIL DESIGNED FOR TWO**

G. J. BINGHAM (Army Aviation Research and Development Command, St. Louis), K. W. NOONAN (Army Aviation Research and Development Command, St. Louis), and W. G. SEWALL Dec.

1981 79 p refs

(DA PROJ. 1L1-61102-AH-45)

(NASA-TP-1965; L-14825; NAS 1.60:1965;

AVRADCOM-TR-81-B-6) Avail: NTIS HC A05/MF A01 CSCL

01A

AERODYNAMIC CHARACTERISTICS, DESIGN ANALYSIS, HELICOPTER DESIGN, ROTARY WINGS, TRANSONIC WIND TUNNELS, WIND TUNNEL TESTS

**N84-28743\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **TWO-DIMENSIONAL AERODYNAMIC CHARACTERISTICS OF THREE ROTORCRAFT AIRFOILS AT MACH NUMBERS FROM 0.35 TO 0.90**

G. J. BINGHAM and K. W. NOONAN May 1982 73 p refs

(DA PROJ. 1L1-61102-AH-45)

(NASA-TP-2000; L-14955; NAS 1.60:2000;

AVRADCOM-TR-82-B-2) Avail: NTIS HC A04/MF A01 CSCL

01A

AERODYNAMIC CHARACTERISTICS, AIRFOILS, HELICOPTER DESIGN, ROTOR BLADES (TURBOMACHINERY)

**N84-28750\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **A NUMERICAL SIMULATION OF THREE-DIMENSIONAL FLOW IN AN ADAPTIVE WALL WIND TUNNEL**

J. P. MENDOZA Aug. 1984 36 p refs

(NASA-TP-2351; A-9622; NAS 1.60:2351) Avail: NTIS HC

A03/MF A01 CSCL 01A

ANALYSIS (MATHEMATICS), COMPUTERIZED SIMULATION, PROTOTYPES, THREE DIMENSIONAL FLOW, WIND TUNNEL TESTS, WIND TUNNELS

**N84-32354\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **FUSELAGE AND NOZZLE PRESSURE DISTRIBUTIONS OF A 1/12-SCALE F-15 PROPULSION MODEL AT TRANSONIC SPEEDS. EFFECT OF FUSELAGE MODIFICATIONS AND NOZZLE VARIABLES**

O. C. PENDERGRAFT, JR. and G. T. CARSON, JR. Aug. 1984 469 p

(NASA-TP-2333; L-15755; NAS 1.60:2333) Avail: NTIS HC

A20/MF A01 CSCL 01A

BODY-WING AND TAIL CONFIGURATIONS, FLOW DISTRIBUTION, FUSELAGES, NOZZLE GEOMETRY, PRESSURE DISTRIBUTION

**N84-33377\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AERODYNAMIC DESIGN OF THE CONTOURED WIND-TUNNEL LINER FOR THE NASA SUPERCRITICAL, LAMINAR-FLOW-CONTROL, SWEEP-WING EXPERIMENT**

R. A. NEWMAN, E. C. ANDERSON, and J. B. PETERSON, JR. Sep. 1984 46 p refs

(NASA-TP-2335; L-15521; NAS 1.60:2335) Avail: NTIS HC

A03/MF A01 CSCL 01A

BOUNDARY LAYER CONTROL, LAMINAR BOUNDARY LAYER, SWEEP WINGS, WIND TUNNEL WALLS

**N84-33379\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF DEPOSITION PATTERNS FROM AN AGRICULTURAL AIRPLANE**

D. J. MORRIS, C. C. CROOM, C. P. VANDAM (Kansas Univ., Lawrence), and B. J. HOLMES Sep. 1984 157 p refs  
 (NASA-TP-2348; L-15718; NAS 1.60:2348) Avail: NTIS HC A08/MF A01 CSCL 01A

AGRICULTURE, AIRSPEED, COMPUTER PROGRAMS, DEPOSITION, FLIGHT TESTS, VELOCITY MEASUREMENT

**N85-10914\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**TRANSONIC FLOW ANALYSIS FOR ROTORS. PART 1: THREE-DIMENSIONAL QUASI-STEADY, FULL-POTENTIAL CALCULATION**

I. C. CHANG Oct. 1984 87 p refs  
 (NASA-TP-2375-PT-1; A-9721-PT-1; NAS 1.60:2375-PT-1) Avail: NTIS HC A05/MF A01 CSCL 01A

COMPUTER PROGRAMS, HELICOPTERS, PRESSURE DISTRIBUTION, ROTARY WINGS, TRANSONIC FLOW

**N85-10920\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL TRIM DRAG VALUES AND FLOW-FIELD MEASUREMENTS FOR A WIDE-BODY TRANSPORT MODEL WITH CONVENTIONAL AND SUPERCRITICAL WINGS**

P. F. JACOBS Oct. 1982 142 p refs  
 (NASA-TP-2071; L-15315; NAS 1.60:2071) Avail: NTIS HC A07/MF A01 CSCL 01A

FLOW DISTRIBUTION, HORIZONTAL TAIL SURFACES, MOMENTS, SUPERCRITICAL WINGS, TRANSPORT AIRCRAFT

**N85-12011\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND TUNNEL WALL INTERFERENCE ASSESSMENT AND CORRECTION, 1983**

P. A. NEWMAN, ed. and R. W. BARNWELL, ed. Washington 1984 417 p refs Workshop held in Hampton, Va., 25-26 Jan. 1983

(NASA-CP-2319; L-15812; NAS 1.55:2319) Avail: NTIS HC A18/MF A01 CSCL 01A

AERODYNAMIC INTERFERENCE, CONFERENCES, FLOW DISTRIBUTION, TRANSONIC WIND TUNNELS, WIND TUNNEL WALLS

**N85-12862\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**APPLICATION OF THE ONERA MODEL OF DYNAMIC STALL**

K. W. MCALISTER, O. LAMBERT (Service Technique des Programmes Aeronautiques, Paris), and D. PETOT (ONERA, Chatillon, France) Nov. 1984 65 p refs  
 (NASA-TP-2399; A-9824; AVSCOM-TR-84-A-3; NAS 1.60:2399; AD-A159502) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AERODYNAMIC STALLING, LOADS (FORCES), LOW SPEED STABILITY

**N85-12864\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOCAL STABILITY ANALYSIS FOR A PLANAR SHOCK WAVE**

M. D. SALAS Dec. 1984 14 p refs  
 (NASA-TP-2387; L-15768; NAS 1.60:2387) Avail: NTIS HC A02/MF A01 CSCL 01A

FLAT SURFACES, NOZZLE FLOW, RANKINE-HUGONIOT RELATION, SHOCK WAVES, STABILITY TESTS

**N85-15693\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**DOWNWASH IN THE PLANE OF SYMMETRY OF AN ELLIPTICALLY LOADED WING**

J. D. PHILLIPS Jan. 1985 26 p refs  
 (NASA-TP-2414; A-9871; NAS 1.60:2414) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, DOWNWASH, ELLIPTICITY, SYMMETRY, WING LOADING

**N85-15694\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A COMPARATIVE STUDY OF THE NONUNIQUENESS PROBLEM OF THE POTENTIAL EQUATION**

M. D. SALAS, A. JAMESON (Princeton Univ., N.J.), and R. E. MELNIK (Grumman Aerospace Corp., Bethpage, N.Y.) Jan. 1985 23 p refs

(NASA-TP-2385; L-15682; NAS 1.60:2385) Avail: NTIS HC A02/MF A01 CSCL 01A

EULER EQUATIONS OF MOTION, INVISCID FLOW, POTENTIAL THEORY, SHOCK WAVES, TRANSONIC FLOW

**N85-18951\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC INTERNAL PERFORMANCE OF A TWO-DIMENSIONAL CONVERGENT NOZZLE WITH THRUST-VECTORING CAPABILITY UP TO 60 DEG**

L. D. LEAVITT Feb. 1985 70 p refs  
 (NASA-TP-2391; L-15837; NAS 1.60:2391) Avail: NTIS HC A04/MF A01 CSCL 01A

CONVERGENT NOZZLES, NOZZLE FLOW, NOZZLE THRUST COEFFICIENTS, THRUST VECTOR CONTROL, WIND TUNNEL TESTS

**N85-19925\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL INVESTIGATION OF A FULL-SCALE CANARD-CONFIGURED GENERAL AVIATION AIRPLANE**

L. P. YIP Mar. 1985 81 p refs  
 (NASA-TP-2382; L-15744; NAS 1.60:2382) Avail: NTIS HC A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, CANARD CONFIGURATIONS, CONTROL STABILITY, CONTROL SURFACES, GENERAL AVIATION AIRCRAFT, WIND TUNNEL TESTS

**N85-21118\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHT-MEASURED LAMINAR BOUNDARY-LAYER TRANSITION PHENOMENA INCLUDING STABILITY THEORY ANALYSIS**

C. J. OBARA (Kentron International, Inc.) and B. J. HOLMES Apr. 1985 40 p refs  
 (NASA-TP-2417; L-15804; NAS 1.60:2417) Avail: NTIS HC A03/MF A01 CSCL 01A

AERODYNAMIC COEFFICIENTS, BOUNDARY LAYER TRANSITION, LAMINAR FLOW, TURBULENT BOUNDARY LAYER

**N85-21120\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SEMIANALYTIC MODELING OF AERODYNAMIC SHAPES**

R. L. BARGER and M. S. ADAMS Apr. 1985 20 p refs  
 (NASA-TP-2413; L-15879; NAS 1.60:2413) Avail: NTIS HC A02/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, DIGITAL TECHNIQUES, GRIDS, LOFTING, SHAPES, SURFACE GEOMETRY

## 02 AERODYNAMICS

**N85-23707\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**CALIBRATION OF SONIC VALVES FOR THE LAMINAR FLOW CONTROL, LEADING-EDGE FLIGHT TEST**

D. H. PETLEY, W. ALEXANDER, JR., A. S. WRIGHT, JR., and M. VALLAS May 1985 53 p refs  
(NASA-TP-2423; L-15893; NAS 1.60:2423) Avail: NTIS HC A04/MF A01 CSCL 01A

FLOW MEASUREMENT, LAMINAR FLOW, MASS FLOW RATE, PRESSURE RATIO, SUCTION, TRANSONIC FLOW

**N85-23708\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED STABILITY AND CONTROL WIND-TUNNEL INVESTIGATIONS OF EFFECTS OF SPANWISE BLOWING ON FIGHTER FLIGHT CHARACTERISTICS AT HIGH ANGLES OF ATTACK**

D. R. SATRAN, W. P. GILBERT, and E. L. ANGLIN May 1985 46 p refs  
(NASA-TP-2431; L-15851; NAS 1.60:2431) Avail: NTIS HC A03/MF A01 CSCL 01A

ANGLE OF ATTACK, FIGHTER AIRCRAFT, FLIGHT CHARACTERISTICS, LOW SPEED STABILITY, SPANWISE BLOWING, WIND TUNNEL TESTS

**N85-26667\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPLORATORY WIND-TUNNEL INVESTIGATION OF A WINGTIP-MOUNTED VORTEX TURBINE FOR VORTEX ENERGY RECOVERY**

J. C. PATTERSON, JR. and S. G. FLECHNER Jun. 1985 24 p  
(NASA-TP-2468; L-15795; NAS 1.60:2468) Avail: NTIS HC A02/MF A01 CSCL 01A

DRAG REDUCTION, ENERGY CONVERSION, TURBINES, VORTICES, WIND TUNNEL TESTS, WING TIPS

**N85-27822\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SUPERSONIC AERODYNAMIC CHARACTERISTICS OF CANARD, TAILLESS, AND AFT-TAIL CONFIGURATIONS FOR 2 WING PLANFORMS**

P. F. COVELL Jun. 1985 69 p refs  
(NASA-TP-2434; L-15927; NAS 1.60:2434) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, BODY-WING AND TAIL CONFIGURATIONS, CANARD CONFIGURATIONS, SUPERSONIC SPEED, WING PLANFORMS

**N85-27823\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**STATIC AND DYNAMIC PRESSURE MEASUREMENTS ON A NACA 0012 AIRFOIL IN THE AMES HIGH REYNOLDS NUMBER FACILITY**

J. B. MCDEVITT and A. F. OKUNO Jun. 1985 78 p refs  
(NASA-TP-2485; A-85100; NAS 1.60:2485) Avail: NTIS HC A05/MF A01 CSCL 02A

AERODYNAMIC CONFIGURATIONS, AERODYNAMIC STABILITY, AIRFOILS, FLOW DISTRIBUTION, SUBSONIC FLOW, SUPERCRITICAL FLOW

**N85-28923\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL EVALUATION OF A 21-PERCENT-SCALE POWERED MODEL OF A PROTOTYPE ADVANCED SCOUT HELICOPTER**

A. E. PHELPS, III and J. D. BERRY Washington NASA, Washington Jun. 1985 76 p refs Prepared in cooperation with Army Aviation Systems Command, St. Louis (DA PROJ. 1L1-62209-AH76)  
(NASA-TP-2420; L-15895; NAS 1.60:2420; AVSCOM-TR-85-B-2; AD-A157115) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, HELICOPTER

PERFORMANCE, P-531 HELICOPTER, SCALE MODELS, WIND TUNNEL TESTS

**N85-28924\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC INVESTIGATION OF SEVERAL YAW VECTORING CONCEPTS ON NONAXISYMMETRIC NOZZLES**

M. L. MASON and B. L. BERRIER Jun. 1985 219 p refs  
(NASA-TP-2432; L-15890; NAS 1.60:2432) Avail: NTIS HC A10/MF A01 CSCL 01A

CONVERGENT-DIVERGENT NOZZLES, STATIC TESTS, THRUST VECTOR CONTROL, WIND TUNNEL TESTS, YAW

**N85-29921\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LEE-SIDE FLOW OVER DELTA WINGS AT SUPERSONIC SPEEDS**

D. S. MILLER and R. M. WOOD Jun. 1985 154 p refs  
(NASA-TP-2430; L-15888; NAS 1.60:2430) Avail: NTIS HC A08/MF A01 CSCL 01A

DELTA WINGS, FLOW VISUALIZATION, LEADING EDGES, SUPERSONIC SPEED, VORTICES

**N85-29922\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND THEORETICAL STUDY OF THE LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF DELTA AND DOUBLE-DELTA WINGS AT MACH NUMBERS OF 1.60, 1.90, AND 2.16**

R. M. WOOD and P. F. COVELL Jul. 1985 122 p refs  
(NASA-TP-2433; L-15899; NAS 1.60:2433) Avail: NTIS HC A06/MF A01 CSCL 01A

DELTA WINGS, SUPERSONIC AIRFOILS, SUPERSONIC FLOW, SWEPTBACK WINGS

**N85-29923\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF LEADING-EDGE LOAD CONSTRAINTS ON THE DESIGN AND PERFORMANCE OF SUPERSONIC WINGS**

C. M. DARDEN Jul. 1985 78 p refs  
(NASA-TP-2446; L-15841; NAS 1.60:2446) Avail: NTIS HC A05/MF A01 CSCL 01A

BOUNDARY LAYER SEPARATION, SUPERSONIC AIRFOILS, SUPERSONIC FLOW, SWEPT WINGS, WIND TUNNEL TESTS

**N85-29924\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NACELLE/PYLON/WING INTEGRATION ON A TRANSPORT MODEL WITH A NATURAL LAMINAR FLOW NACELLE**

M. LAMB, W. K. AABEYOUNIS, and J. C. PATTERSON, JR. Jul. 1985 61 p refs  
(NASA-TP-2439; L-15907; NAS 1.60:2439) Avail: NTIS HC A04/MF A01 CSCL 01A

LAMINAR FLOW, PYLONS, TRANSPORT AIRCRAFT, TURBULENT FLOW, WIND TUNNEL TESTS, WING NACELLE CONFIGURATIONS

**N85-31010\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-SPEED TESTS OF A HIGH-ASPECT-RATIO, SUPERCRITICAL-WING TRANSPORT MODEL EQUIPPED WITH A HIGH-LIFT FLAP SYSTEM IN THE LANGLEY 4-BY 7-METER AND AMES 12-FOOT PRESSURE TUNNELS**

H. L. MORGAN, JR. and S. O. KJELGAARD Jul. 1983 277 p refs  
(NASA-TP-2097; L-15484; NAS 1.60:2097) Avail: NTIS HC A12/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, HIGH ASPECT RATIO, LEADING EDGE SLATS, LOW SPEED STABILITY, REYNOLDS NUMBER, SLENDER WINGS, SUPERCRITICAL WINGS, TRAILING EDGE FLAPS, TRANSPORT AIRCRAFT, WIND TUNNEL TESTS, WING PROFILES

**N85-33106\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN IMAGE COMPRESSION SURVEY AND ALGORITHM SWITCHING BASED ON SCENE ACTIVITY**

M. M. HART Aug. 1985 20 p refs  
(NASA-TP-2458; L-15957; NAS 1.60:2458) Avail: NTIS HC  
A02/MF A01 CSCL 01A

ALGORITHMS, COMPUTER SYSTEMS PERFORMANCE, DATA COMPRESSION, DATA TRANSMISSION, IMAGING TECHNIQUES, SCENE ANALYSIS, SIGNAL DISTORTION

**N85-33107\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS OF A DISTINCT WING-BODY CONFIGURATION AT MACH 6: EXPERIMENT, THEORY, AND THE HYPERSONIC ISOLATION PRINCIPLE**

J. A. PENLAND and J. L. PITTMAN Aug. 1985 34 p refs  
(NASA-TP-2467; L-15951; NAS 1.60:2467) Avail: NTIS HC  
A03/MF A01 CSCL 01A

AERODYNAMIC CONFIGURATIONS, FUSELAGES, HYPERSONIC AIRCRAFT, LEADING EDGE FLAPS, LOW REYNOLDS NUMBER, WINGS

**N86-11186\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF AILERON DEFLECTIONS ON THE AERODYNAMIC CHARACTERISTICS OF A SEMISPAN MODEL OF A SUBSONIC ENERGY-EFFICIENT TRANSPORT**

P. F. JACOBS Oct. 1985 344 p refs  
(NASA-TP-2478; L-15934; NAS 1.60:2478) Avail: NTIS HC  
A15/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, AILERONS, SUPERCRITICAL WINGS, TRANSPORT AIRCRAFT, WIND TUNNEL MODELS

**N86-16193\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS OF A HIGH-WING TRANSPORT CONFIGURATION WITH A OVER-THE-WING NACELLE-PYLON ARRANGEMENT**

W. P. HENDERSON and W. K. ABEYOUNIS Dec. 1985 93 p refs  
(NASA-TP-2497; L-15959; NAS 1.60:2497) Avail: NTIS HC  
A05/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, ENGINE AIRFRAME INTEGRATION, NACELLES, PYLON MOUNTING, TRANSONIC WIND TUNNELS, TRANSPORT AIRCRAFT, WIND TUNNEL TESTS

**N86-18289\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPRESSIBLE, UNSTEADY LIFTING-SURFACE THEORY FOR A HELICOPTER ROTOR IN FORWARD FLIGHT**

H. L. RUNYAN and H. TAI Dec. 1985 21 p refs  
(NASA-TP-2503; L-15976; NAS 1.60:2503) Avail: NTIS HC  
A02/MF A01 CSCL 01A

ACCELERATION (PHYSICS), COMPRESSIBLE FLOW, HELICOPTERS, LIFT DEVICES, LIFTING ROTORS, UNSTEADY FLOW

**N86-20345\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF UNDERWING AFT-MOUNTED NACELLES ON THE LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A HIGH-WING TRANSPORT AIRPLANE**

W. K. ABEYOUNIS and J. C. PATTERSON, JR. Dec. 1985 139 p refs  
(NASA-TP-2447; L-15664; NAS 1.60:2447) Avail: NTIS HC  
A07/MF A01 CSCL 01A

AERODYNAMIC INTERFERENCE, ENGINE INLETS, NACELLES, SHOCK ABSORBERS, SUPERSONIC AIRCRAFT, TRANSPORT AIRCRAFT

**N86-20346\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INSTALLATION EFFECTS OF LONG-DUCT PYLON-MOUNTED NACELLES ON A TWIN-JET TRANSPORT MODEL WITH SWEEP SUPERCRITICAL WING**

E. E. LEE, JR. and O. C. PENDERGRAFT, JR. Dec. 1985 145 p refs  
(NASA-TP-2457; L-15932; NAS 1.60:2457) Avail: NTIS HC  
A07/MF A01 CSCL 01A

AERODYNAMIC INTERFERENCE, DUCT GEOMETRY, JET AIRCRAFT, NACELLES, SUPERCRITICAL WINGS, TRANSPORT AIRCRAFT

**N86-20347\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ORIFICE-INDUCED PRESSURE ERROR STUDIES IN LANGLEY 7- BY 10-FOOT HIGH-SPEED TUNNEL**

E. B. PLENTOVICH and B. B. GLOSS Feb. 1986 24 p refs  
(NASA-TP-2545; L-16001; NAS 1.60:2545) Avail: NTIS HC  
A02/MF A01 CSCL 01A

ERRORS, FLAT PLATES, ORIFICES, PRESSURE MEASUREMENT, STATIC PRESSURE, WIND TUNNEL TESTS

**N86-20348\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC INTERNAL PERFORMANCE OF A SINGLE-ENGINE ONAXISYMMETRIC-NOZZLE VANED-THRUST-REVERSER DESIGN WITH THRUST MODULATION CAPABILITIES**

L. D. LEAVITT and J. R. BURLEY, II Dec. 1985 109 p refs  
(NASA-TP-2519; L-15991; NAS 1.60:2519) Avail: NTIS HC  
A06/MF A01 CSCL 01A

NOZZLE GEOMETRY, STATIC TESTS, THRUST REVERSAL, WIND TUNNEL TESTS

**N86-20349\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC CHARACTERISTICS OF SEVERAL CURRENT HELICOPTER TAIL BOOM CROSS SECTIONS INCLUDING THE EFFECT OF SPOILERS**

J. C. WILSON and H. L. KELLEY Jan. 1986 74 p refs  
(DA PROJ. 1L1-61102-AH-45)  
(NASA-TP-2506; L-15978; NAS 1.60:2506; AVSCOM-TR-85-B-3)  
Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, FUSELAGES, HELICOPTER TAIL ROTORS, HOVERING, SPOILERS, TAIL ASSEMBLIES

**N86-20350\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHT MEASUREMENTS OF SURFACE PRESSURES ON A FLEXIBLE SUPERCRITICAL RESEARCH WING**

C. V. ECKSTROM Dec. 1985 120 p refs  
(NASA-TP-2501; L-15877; NAS 1.60:2501) Avail: NTIS HC  
A06/MF A01 CSCL 01A

FLEXIBLE WINGS, PRESSURE MEASUREMENT, SUPERCRITICAL PRESSURES, SUPERCRITICAL WINGS

**N86-20351\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE APPLICATION TO AIRFOILS OF A TECHNIQUE FOR REDUCING ORIFICE-INDUCED PRESSURE ERROR AT HIGH REYNOLDS NUMBERS**

E. B. PLENTOVICH Jan. 1986 44 p refs  
(NASA-TP-2537; L-16002; NAS 1.60:2537) Avail: NTIS HC  
A03/MF A01 CSCL 01A

AIRFOILS, BOUNDARY LAYER STABILITY, ERRORS, ORIFICES, STATIC PRESSURE, TRANSONIC FLOW

## 02 AERODYNAMICS

**N86-20352\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **BREAKDOWN OF THE CONSERVATIVE POTENTIAL EQUATION**

M. D. SALAS and C. R. GUMBERT Feb. 1986 38 p refs  
Previously announced in IAA as A85-19700

(NASA-TP-2539; L-15769; NAS 1.60:2539) Avail: NTIS HC A03/MF A01

FLOW EQUATIONS, POTENTIAL FLOW, TRANSONIC FLOW

**N86-21506\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **ANALYSIS OF JIMSPHERE PAIRS FOR USE IN ASSESSING SPACE VEHICLE ASCENT CAPABILITY**

C. K. HILL Mar. 1986 113 p refs

(NASA-TP-2573; NAS 1.60:2573) Avail: NTIS HC A06/MF A01 CSCL 01A

ASCENT PROPULSION SYSTEMS, SPACECRAFT LAUNCHING, WIND PROFILES, WIND SHEAR, WIND VARIATIONS

**N86-21507\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **INVESTIGATION OF SOLID PLUME SIMULATION CRITERIA TO PRODUCE FLIGHT PLUME EFFECTS ON MULTIBODY CONFIGURATION IN WIND TUNNEL TESTS**

A. L. FROST and C. C. DILL Mar. 1986 182 p

(NASA-TP-2569; NAS 1.60:2569) Avail: NTIS HC A09/MF A01 CSCL 01A

COMPUTERIZED SIMULATION, PLUMES, SPACE SHUTTLES, WIND TUNNEL TESTS

**N86-23558\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **MACH 6 FLOW FIELD SURVEYS BENEATH THE FOREBODY OF AN AIRBREATHING MISSILE**

P. J. JOHNSON and J. L. HUNT Mar. 1986 155 p refs

(NASA-TP-2491; L-15973; NAS 1.60:2491) Avail: NTIS HC A08/MF A01 CSCL 01A

AIR BREATHING BOOSTERS, BOUNDARY LAYERS, FLOW DISTRIBUTION, HYPERSONIC SPEED, MACH NUMBER, MISSILES, REYNOLDS NUMBER, WIND TUNNEL TESTS

**N86-23559\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STATIC INVESTIGATION OF TWO STOL NOZZLE CONCEPTS WITH PITCH THRUST-VECTERING CAPABILITY**

M. L. MASON and J. R. BURLEY, II Apr. 1986 57 p refs

(NASA-TP-2559; L-165052; NAS 1.60:2559) Avail: NTIS HC A04/MF A01 CSCL 01A

AXISYMMETRIC FLOW, NOZZLE GEOMETRY, NOZZLE THRUST COEFFICIENTS, SHORT TAKEOFF AIRCRAFT, STATIC TESTS, THRUST VECTOR CONTROL

**N86-23560\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STATIC INTERNAL PERFORMANCE OF A THRUST VECTERING AND REVERSING TWO-DIMENSIONAL CONVERGENT-DIVERGENT NOZZLE WITH AN AFT FLAP**

H. J. RE and L. D. LEAVITT Apr. 1986 113 p refs

(NASA-TP-2549; L-16025; NAS 1.60:2549) Avail: NTIS HC A06/MF A01 CSCL 01A

NOZZLE GEOMETRY, STATIC TESTS, THRUST REVERSAL, THRUST VECTOR CONTROL, TRANSONIC WIND TUNNELS, WIND TUNNEL TESTS

**N86-23561\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AERODYNAMIC CHARACTERISTICS OF A SUPERSONIC FIGHTER AIRCRAFT MODEL AT MACH 0.40 TO 2.47**

F. J. CAPONE, E. A. BARE, and D. ARBITER (George Washington Univ., Hampton, Va.) Apr. 1986 105 p refs

(NASA-TP-2580; L-16017; NAS 1.60:2580) Avail: NTIS HC A06/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, DATA BASES, FIGHTER AIRCRAFT, SUPERSONIC AIRCRAFT

**N86-23562\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EFFECTS OF UPPER-SURFACE NACELLES ON LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF HIGH-WING TRANSPORT CONFIGURATION**

L. E. PUTNAM Apr. 1986 70 p refs

(NASA-TP-2579; L-16062; NAS 1.60:2579) Avail: NTIS HC A04/MF A01 CSCL 01A

AERODYNAMIC CHARACTERISTICS, BODY-WING CONFIGURATIONS, TRANSONIC SPEED, TRANSPORT AIRCRAFT, WIND TUNNEL TESTS

**N86-24662\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **R4 AIRFOIL DATA CORRECTED FOR SIDEWALL BOUNDARY-LAYER EFFECTS IN THE LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL**

R. V. JENKINS May 1986 114 p refs

(NASA-TP-2565; L-16066; NAS 1.60:2565) Avail: NTIS HC A06/MF A01 CSCL 01A

AIRFOILS, BOUNDARY LAYERS, CRYOGENIC WIND TUNNELS, TRANSONIC WIND TUNNELS

**N86-27190\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **VORTEX FLOW AERODYNAMICS, VOLUME 1**

J. F. CAMPBELL, ed., R. F. OSBORN, ed. (Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio), and J. T. FOUGHNER, JR., ed. Jul. 1986 404 p Conference held in Hampton, Va., 8-10 Oct. 1985

(NASA-CP-2416-VOL-1; L-16117; NAS 1.55:2416-VOL-1) Avail: NTIS HC A18/MF A01 CSCL 01A

AERODYNAMICS, AIRCRAFT DESIGN, AIRCRAFT MODELS, VORTEX FLAPS, VORTICES, WIND TUNNEL TESTS

## 03

### **AIR TRANSPORTATION AND SAFETY**

Includes passenger and cargo air transport operations; and aircraft accidents.

**N77-18081\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AIRCRAFT SAFETY AND OPERATING PROBLEMS**

1976 644 p refs Conf. Proc. held at Hampton, Va., 18-20 Oct. 1976

(NASA-SP-416) Avail: NTIS HC A99/MF A01 CSCL 01C

Results of NASA research in the field of aircraft safety and operating problems are discussed. Topics include: (1) terminal area operations; (2) flight dynamics and control; (3) ground operations; (4) atmospheric environment; (5) structures and materials; (6) powerplants; (7) noise; and (8) human factors engineering.



**N78-10034\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**LIGHT AIRPLANE CRASH TESTS AT IMPACT VELOCITIES OF 13 AND 27 M/SEC**  
 E. ALFARO-BOU and V. L. VAUGHAN, JR. Nov. 1977 52 p refs  
 (NASA-TP-1042; L-11426) Avail: NTIS HC A04/MF A01  
 CSCL 01C  
 CRASH LANDING, FLIGHT TESTS, IMPACT TOLERANCES

**N78-11024\*#** General Electric Co., Pittsfield, Mass.  
**LIGHTNING PROTECTION OF AIRCRAFT**  
 F. A. FISHER and J. A. PLUMER Oct. 1977 530 p refs  
 (NAS3-19080)  
 (NASA-RP-1008) Avail: NTIS HC A23/MF A01 CSCL 01C  
 The current knowledge concerning potential lightning effects on aircraft and the means that are available to designers and operators to protect against these effects are summarized. The increased use of nonmetallic materials in the structure of aircraft and the constant trend toward using electronic equipment to handle flight-critical control and navigation functions have served as impetus for this study. For individual titles, see N78-11025 through N78-11041.

**N78-13029\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EFFECTS OF LANDING APPROACH METHODS AND SEPARATION INTERVALS ON SINGLE RUNWAY LANDING CAPACITY**  
 E. C. HASTINGS, JR. and R. T. TAYLOR Dec. 1977 40 p refs  
 (NASA-TP-1112; L-11834) Avail: NTIS HC A03/MF A01  
 CSCL 17G  
 AIRCRAFT LANDING, APPROACH, RUNWAYS, TRANSPORT AIRCRAFT

**N79-21021\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**OZONE CONTAMINATION IN AIRCRAFT CABINS**  
 Washington, D. C. NASA Mar. 1979 81 p refs Workshop held at Moffett Field, Calif., 27-28 Jul. 1978  
 (NASA-CP-2066; E-9797) Avail: NTIS HC A05/MF A01 CSCL 06S  
 AIRCRAFT COMPARTMENTS, CONTAMINATION, NASA PROGRAMS, OZONE

**N79-31166\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**CONFERENCE ON FIRE RESISTANT MATERIALS: A COMPILATION OF PRESENTATIONS AND PAPERS**  
 D. A. KOURTIDES, ed. and G. A. JOHNSON, ed. (Boeing Com. Airplane Co., Seattle, Wash.) Jul. 1979 287 p Conf. held in Seattle, 1-2 Mar. 1979  
 (NASA-CP-2094; A-7894) Avail: NTIS HC A13/MF A01 CSCL 01C  
 CONFERENCES, FIREBREAKS, FIREPROOFING, FIRES, FLAMMABILITY, NONFLAMMABLE MATERIALS

**N79-33171\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**PROCEDURES FOR ESTIMATING THE FREQUENCY OF COMMERCIAL AIRLINE FLIGHTS ENCOUNTERING HIGH CABIN OZONE LEVELS**  
 J. D. HOLDEMAN Oct. 1979 56 p refs  
 (NASA-TP-1560; E-9991) Avail: NTIS HC A04/MF A01 CSCL 01C  
 AIRCRAFT COMPARTMENTS, COMMERCIAL AIRCRAFT, OZONE

**N80-13013\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**WEAR, FRICTION, AND TEMPERATURE CHARACTERISTICS OF AN AIRCRAFT TIRE UNDERGOING BRAKING AND CORNERING**  
 J. L. MCCARTY, T. J. YAGER, and S. R. RICCIITIELLO (NASA. Ames Res. Center) Washington Dec. 1979 40 p refs  
 (NASA-TP-1569; L-13239) Avail: NTIS HC A03/MF A01  
 CSCL 01C  
 AIRCRAFT TIRES, BRAKING, KINETIC FRICTION, WEAR TESTS

**N80-22283\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**RESOURCE MANAGEMENT ON THE FLIGHT DECK**  
 G. E. COOPER, ed., M. D. WHITE, ed. (Cooper (George E.), Saratoga, Calif.), and J. K. LAUBER, ed. Mar. 1980 247 p refs Proceedings of a NASA/Industry Workshop, San Francisco, 26-28 Jun. 1979  
 (NASA-CP-2120) Avail: NTIS HC A11/MF A01 CSCL 05J  
 CONFERENCES, FLIGHT CREWS, FLIGHT TRAINING, PERSONNEL MANAGEMENT, PILOT PERFORMANCE, PILOT SELECTION

**N80-27302\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**TIRE STIFFNESS AND DAMPING DETERMINED FROM STATIC AND FREE-VIBRATION TESTS**  
 R. K. SLEEPER and R. C. DREHER Jul. 1980 45 p refs  
 (NASA-TP-1671; L-13500) Avail: NTIS HC A03/MF A01  
 CSCL 01C  
 AIRCRAFT TIRES, DAMPING, DYNAMIC TESTS, RESILIENCE, STATIC TESTS, STIFFNESS, VIBRATION TESTS

**N81-12043\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**A SIMULATOR STUDY FOR THE DEVELOPMENT AND EVALUATION OF OPERATING PROCEDURES ON A SUPERSONIC CRUISE RESEARCH TRANSPORT TO MINIMIZE AIRPORT-COMMUNITY NOISE**  
 W. D. GRANTHAM, P. M. SMITH (Kentron International, Inc., Hampton, Va.), and P. L. DEAL Nov. 1980 79 p refs  
 (NASA-TP-1742; L-13881) Avail: NTIS HC A05/MF A01  
 CSCL 01C  
 FLIGHT SIMULATION, JET AIRCRAFT NOISE, LANDING, NOISE REDUCTION, SUPERSONIC AIRCRAFT, TAKEOFF RUNS

**N81-19035\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**THE 1980 AIRCRAFT SAFETY AND OPERATING PROBLEMS, PART 1**  
 J. W. STICKLE, comp. Mar. 1981 380 p refs Conf. held in Hampton, Va., 5-7 Nov. 1980 2 Vol.  
 (NASA-CP-2170-PT-1; L-14254) Avail: NTIS HC A17/MF A01  
 CSCL 01C  
 AERONAUTICAL ENGINEERING, AIRCRAFT SAFETY, CONFERENCES, FLIGHT CONTROL, NASA PROGRAMS, OPERATIONAL PROBLEMS

**N81-19056\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**THE 1980 AIRCRAFT SAFETY AND OPERATING PROBLEMS, PART 2**  
 J. W. STICKLE, comp. Mar. 1981 390 p refs Conf. held in Hampton, Va., 5-7 Nov. 1980 2 Vol.  
 (NASA-CP-2170-PT-2; L-14254) Avail: NTIS HC A17/MF A01  
 CSCL 01C  
 ACOUSTICS, AVIONICS, CONFERENCES, FLIGHT TESTS, HUMAN FACTORS ENGINEERING, NOISE REDUCTION, TERMINAL FACILITIES

### 03 AIR TRANSPORTATION AND SAFETY

**N81-29109\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF DISPLAY SIZE ON UTILIZATION OF TRAFFIC SITUATION DISPLAY FOR SELF-SPACING TASK**

T. S. ABBOTT and G. C. MOEN (Army Aviation Research and Development Command, Hampton, Va.) Aug. 1981 30 p refs (DA PROJ. 1L2-62209-AH-76)

(NASA-TP-1885; L-14418; AVRADCOM-TR-81-B-4) Avail: NTIS HC A03/MF A01 CSCL 17G

AIR TRAFFIC CONTROL, AIRCRAFT APPROACH SPACING, DISPLAY DEVICES, SIZE (DIMENSIONS), TRANSPORT AIRCRAFT

**N81-30101\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**GUIDELINES FOR LINE-ORIENTED FLIGHT TRAINING, VOLUME 1**

J. K. LAUBER and H. C. FOUSHEE Aug. 1981 46 p refs Proceedings of NASA/Industry Workshop, Moffett Field, Calif., 13-15 Jan. 1981

(NASA-CP-2184; A-8585-VOL-1) Avail: NTIS HC A03/MF A01 CSCL 01C

COMMAND AND CONTROL, FLIGHT SIMULATION, PILOT TRAINING, RESOURCES MANAGEMENT

**N81-31162\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**INFORMATION TRANSFER PROBLEMS IN THE AVIATION SYSTEM**

C. E. BILLINGS, ed. and E. S. CHEANEY, ed. Sep. 1981 95 p refs

(NASA-TP-1875; A-8567) Avail: NTIS HC A05/MF A01 CSCL 17B

GROUND-AIR-GROUND COMMUNICATION, HUMAN PERFORMANCE, VOICE COMMUNICATION

**N82-13123\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**GUIDELINES FOR LINE-ORIENTED FLIGHT TRAINING, VOLUME 2**

J. K. LAUBER and H. C. FOUSHEE 1981 156 p refs Proceedings of conf. held at NASA Ames Research Center, Calif., 13-15 Jan. 1981

(NASA-CP-2184-VOL-2) Avail: NTIS HC A08/MF A01 CSCL 05I

CIVIL AVIATION, CONFERENCES, FLIGHT CREWS, FLIGHT TRAINING, TRAINING SIMULATORS

**N82-23208\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**HELICOPTER HANDLING QUALITIES**

Apr. 1982 243 p refs Proceedings of the special meeting held at Moffett Field, Calif., 14-15 Apr. 1982; sponsored by the American Helicopter Society

(NASA-CP-2219; A-8891; NAS 1.55:2219) Avail: NTIS HC A11/MF A01 CSCL 01C

AIRCRAFT SPECIFICATIONS, AVIONICS, COCKPITS, CONFERENCES, CONTROLLABILITY, HELICOPTER CONTROL, MANEUVERABILITY, NAP-OF-THE-EARTH NAVIGATION, NIGHT FLIGHTS (AIRCRAFT)

**N83-14077\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LIGHTNING ATTACHMENT PATTERNS AND FLIGHT CONDITIONS FOR STORM HAZARDS, 1980**

B. D. FISHER, G. L. KEYSER, JR. (Air Force Systems Liaison Office, Langley, Va.), and P. L. DEAL Dec. 1982 71 p refs Prepared in cooperation with Lightning Technologies, Inc. (NAS1-15884)

(NASA-TP-2087; L-15438; NAS 1.60:2087) Avail: NTIS HC A04/MF A01 CSCL 01C

F-106 AIRCRAFT, FLIGHT TESTS, LIGHTNING, STORM DAMAGE, THUNDERSTORMS

**N83-34921\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CRASH TESTS OF THREE IDENTICAL LOW-WING SINGLE-ENGINE AIRPLANE**

C. B. CASTLE and E. ALFARO-BOU Sep. 1983 39 p refs (NASA-TP-2190; L-15601; NAS 1.60:2190) Avail: NTIS HC A03/MF A01 CSCL 01C

AIRCRAFT SAFETY, CONCRETES, CRASHES, GENERAL AVIATION AIRCRAFT, SOILS

**N85-18009\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**FLIGHT TRAINING TECHNOLOGY FOR REGIONAL/COMMUTER AIRLINE OPERATIONS: REGIONAL AIRLINE ASSOCIATION/ NASA WORKSHOP PROCEEDINGS**

A. T. LEE, ed. and J. K. LAUBER, ed. Dec. 1984 253 p refs Workshop held at Moffett Field, Calif., 28-30 Sep. 1983

(NASA-CP-2348; A-9863; NAS 1.55:2348) Avail: NTIS HC A12/MF A01 CSCL 05I

CIVIL AVIATION, CONFERENCES, FLIGHT SAFETY, FLIGHT TRAINING, MANAGEMENT, PILOT TRAINING

**N85-32101\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SIMULATION STUDIES OF TIME-CONTROL PROCEDURES FOR THE ADVANCED AIR TRAFFIC CONTROL SYSTEM**

L. TOBIAS, M. ALCABIN, H. ERZBERGER, and P. J. OBRIEN Jul. 1985 18 p refs

(NASA-TP-2493; T-3309; NAS 1.60:2493) Avail: NTIS HC A02/MF A01 CSCL 01C

AIR TRAFFIC CONTROL, AIRCRAFT EQUIPMENT, AIRCRAFT GUIDANCE, COMPUTERIZED SIMULATION, GROUND BASED CONTROL, SCHEDULING

## 04

### AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

**N80-13020\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL DETERMINATION OF POSITION-ESTIMATE ACCURACY USING BACK-AZIMUTH SIGNALS FROM A MICROWAVE LANDING SYSTEM**

C. E. KNOX Dec. 1979 37 p (NASA-TP-1574; L-13074) Avail: NTIS HC A03/MF A01 CSCL 17G

MICROWAVE LANDING SYSTEMS, NAVIGATION AIDS, POSITION (LOCATION)

**N80-28329\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**ALGORITHM FOR FIXED-RANGE OPTIMAL TRAJECTORIES**

H. Q. LEE and H. ERZBERGER Jul. 1980 86 p refs (NASA-TP-1565; A-8003) Avail: NTIS HC A05/MF A01 CSCL 17G

ALGORITHMS, COMPUTER PROGRAMS, COST REDUCTION, HAMILTONIAN FUNCTIONS, TRAJECTORY OPTIMIZATION

## 05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

**N81-29111\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EVALUATION OF MICROWAVE LANDING SYSTEM (MLS) EFFECT ON THE DELIVERY PERFORMANCE OF A FIXED-PATH METERING AND SPACING SYSTEM**

L. CREDEUR, C. M. DAVIS (Research Triangle Inst., Research Triangle Park, N.C.), and W. R. CAPRON (Kentron International, Inc., Hampton, Va.) Aug. 1981 132 p refs  
(NASA-TP-1844; L-14069) Avail: NTIS HC A07/MF A01  
CSCL 17G

AIRCRAFT APPROACH SPACING, AREA NAVIGATION, MICROWAVE LANDING SYSTEMS

**N82-22239\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF CABLE GEOMETRY AND AIRCRAFT ATTITUDE ON THE ACCURACY OF A MAGNETIC LEADER CABLE SYSTEM FOR AIRCRAFT GUIDANCE DURING ROLLOUT AND TURNOFF**

W. T. BUNDICK Apr. 1982 32 p refs  
(NASA-TP-1978; L-14975; NAS 1.60:1978) Avail: NTIS HC A03/MF A01 CSCL 17G

AIRCRAFT CONTROL, AIRCRAFT GUIDANCE, MAGNETIC CONTROL, TAXIING, TECHNOLOGY ASSESSMENT

**N82-23233\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYSIS AND MONTE CARLO SIMULATION OF NEAR-TERMINAL AIRCRAFT FLIGHT PATHS**

J. R. SCHIESS and C. G. MATTHEWS (Computer Sciences Corp.) Apr. 1982 39 p refs  
(NASA-TP-1997; L-15062; NAS 1.60:1997) Avail: NTIS HC A03/MF A01 CSCL 17G

AIR TRAFFIC CONTROL, AIRCRAFT LANDING, AIRPORTS, FLIGHT PATHS, PARAMETER IDENTIFICATION, TAKEOFF

**N83-18704\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**HELICAL AUTOMATIC APPROACHES OF HELICOPTERS WITH MICROWAVE LANDING SYSTEMS**

J. D. FOSTER, L. A. MCGEE, and D. C. DUGAN Dec. 1982 89 p refs  
(NASA-TP-2109; A-9034; NAS 1.60:2109) Avail: NTIS HC A05/MF A01 CSCL 17G

AIR TRAFFIC CONTROL, ALL-WEATHER LANDING SYSTEMS, APPROACH CONTROL, AUTOMATIC LANDING CONTROL, FLIGHT TESTS, HELICOPTERS, MICROWAVE LANDING SYSTEMS

**N83-29193\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**DEVELOPMENT AND EVALUATION OF A KALMAN-FILTER ALGORITHM FOR TERMINAL AREA NAVIGATION USING SENSORS OF MODERATE ACCURACY**

G. KANNING, L. S. CICOLANI, and S. F. SCHMIDT (Analytical Mechanics Associates, Inc., Mountain View, Calif.) Jul. 1983 147 p refs  
(NASA-TP-2035; A-8955; NAS 1.60:2035) Avail: NTIS HC A07/MF A01 CSCL 17G

AREA NAVIGATION, AUTOMATIC FLIGHT CONTROL, DIGITAL NAVIGATION, KALMAN FILTERS, SYSTEMS SIMULATION, TRAJECTORIES

**N84-17165\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A COMPARISON OF TWO POSITION ESTIMATE ALGORITHMS THAT USE ILS LOCALIZER AND DME INFORMATION. SIMULATION AND FLIGHT TEST RESULTS**

C. E. KNOX, D. D. VICROY, and C. SCANLON (Arkansas State Univ.) Feb. 1984 39 p refs  
(NASA-TP-2281; L-15711; NAS 1.60:2281) Avail: NTIS HC A03/MF A01 CSCL 17G

AIRCRAFT GUIDANCE, ALGORITHMS, APPROACH, AREA NAVIGATION, FLIGHT TESTS, INSTRUMENT LANDING SYSTEMS

**N85-14806\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**TECHNICAL WORKSHOP: ADVANCED HELICOPTER COCKPIT DESIGN**

J. C. HEMINGWAY, ed. and G. P. CALLAS, ed. Dec. 1984 346 p refs Workshop held at Moffett Field, Calif., 26-28 Jul. 1983

(NASA-CP-2351; REPT-85057; NAS 1.55:2351) Avail: NTIS HC A15/MF A01 CSCL 01D

COCKPITS, CONFERENCES, HELICOPTERS, HUMAN FACTORS ENGINEERING, MAN MACHINE SYSTEMS, SOFTWARE ENGINEERING, STRUCTURAL DESIGN CRITERIA

## 05

### AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

**N78-10048\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MEASUREMENT OF MODEL AEROELASTIC DEFORMATIONS IN THE WIND TUNNEL AT TRANSONIC SPEEDS USING STEREOPHOTOGRAMMETRY**

J. D. BROOKS and J. K. BEAMISH (General Dynamics Corp., Fort Worth, Tex.) 1977 43 p refs  
(NASA-TP-1010; L-11092) Avail: NTIS HC A03/MF A01 CSCL 01C

AEROELASTICITY, ELASTIC DEFORMATION, STEREOPHOTOGRAPHY

**N78-10049\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VALIDATION OF A FLEXIBLE AIRCRAFT TAKE-OFF AND LANDING ANALYSIS (FATOLA)**

H. D. CARDEN and J. R. MCGEHEE 1977 68 p refs  
(NASA-TP-1025; L-11704) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT LANDING, COMPUTER PROGRAMS, TAKEOFF

**N78-11053\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL TESTS OF WIDE-CHORD TEETERING ROTORS WITH AND WITHOUT OUTBOARD FLAPPING HINGES**

W. H. WELLER (Army Aviat. Res. and Develop. Command, St. Louis, Mo.) and B. L. LEE Washington Nov. 1977 76 p refs  
(DA PROJ. 1L2-62209-AH-76)  
(NASA-TP-1046; L-11749) Avail: NTIS HC A05/MF A01 CSCL 01C

ROTARY WINGS, ROTOR AERODYNAMICS, TEETERING, WIND TUNNEL TESTS

## 05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

**N78-13043\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FRICTION CHARACTERISTICS OF THREE 30 BY 11.5-14.5, TYPE 8, AIRCRAFT TIRES WITH VARIOUS TREAD GROOVE PATTERNS AND RUBBER COMPOUNDS**

T. J. YAGER and J. L. MCCARTY Dec. 1977 25 p refs  
(NASA-TP-1080; L-11808) Avail: NTIS HC A02/MF A01  
CSCL 11G

AIRCRAFT TIRES, FRICTION MEASUREMENT, RUBBER, TREADS

**N78-16042\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**GEMPAK: AN ARBITRARY AIRCRAFT GEOMETRY GENERATOR**

S. H. STACK, C. L. W. EDWARDS, and W. J. SMALL Dec. 1977 167 p refs  
(NASA-TP-1022; L-11666) Avail: NTIS HC A08/MF A01  
CSCL 01C

AIRCRAFT DESIGN, BODY-WING AND TAIL CONFIGURATIONS, COMPUTER PROGRAMS, REPORT GENERATORS

**N78-18044\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A FLIGHT EVALUATION OF A TRAILING ANEMOMETER FOR LOW-SPEED CALIBRATIONS OF AIRSPEED SYSTEMS ON RESEARCH AIRCRAFT**

B. D. FISHER, B. J. HOLMES, and H. P. STOUGH, III Feb. 1978 62 p refs  
(NASA-TP-1135; L-11960) Avail: NTIS HC A04/MF A01  
CSCL 01C

AIRSPEED, ANEMOMETERS, CALIBRATING, FLIGHT TESTS, LOW SPEED, RESEARCH AIRCRAFT

**N78-20114\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**DEVELOPMENT OF SYSTEMS AND TECHNIQUES FOR LANDING AN AIRCRAFT USING ONBOARD TELEVISION**

S. W. GEE, P. C. CARR, W. R. WINTER, and J. A. MANKE Feb. 1978 24 p refs  
(NASA-TP-1171; H-973) Avail: NTIS HC A02/MF A01  
CSCL 01C

AIRCRAFT LANDING, F-15 AIRCRAFT, INSTRUMENT LANDING SYSTEMS, REMOTELY PILOTED VEHICLES, TELEVISION SYSTEMS

**N78-20115\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**GROUND DISTANCE COVERED DURING AIRBORNE HORIZONTAL DECELERATION OF AN AIRPLANE**

W. H. PHILLIPS Apr. 1978 13 p refs  
(NASA-TP-1157; L-12008) Avail: NTIS HC A02/MF A01  
CSCL 01C

AIRCRAFT LANDING, DECELERATION, GENERAL AVIATION AIRCRAFT, LANDING LOADS, LANDING SPEED

**N78-25079\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PRELIMINARY STUDY OF A LARGE SPAN-DISTRIBUTED-LOAD FLYING-WING CARGO AIRPLANE CONCEPT**

L. S. JERNELL May 1978 105 p refs  
(NASA-TP-1158; L-11943) Avail: NTIS HC A06/MF A01  
CSCL 01C

AERODYNAMIC CHARACTERISTICS, AIRCRAFT DESIGN, CARGO AIRCRAFT, DESIGN ANALYSIS, SPANLOADER AIRCRAFT, WING LOADING

**N78-27111\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**GROUND-BASED AND IN-FLIGHT SIMULATOR STUDIES OF LOW-SPEED HANDLING CHARACTERISTICS OF TWO SUPERSONIC CRUISE TRANSPORT CONCEPTS**

W. D. GRANTHAM, L. T. NGUYEN, P. L. DEAL, M. J. NEUBAUER, P. M. SMITH (Vought Corporation Hampton Technical Center, Hampton, Va.), and F. D. GREGORY Jul. 1978 101 p refs  
(NASA-TP-1240; L-12165) Avail: NTIS HC A06/MF A01  
CSCL 01C

APPROACH CONTROL, CONTROLLABILITY, LANDING, LOW SPEED STABILITY, SUPERSONIC TRANSPORTS

**N78-27113\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**APPLICATION OF SPECIAL-PURPOSE DIGITAL COMPUTERS TO ROTORCRAFT REAL-TIME SIMULATION**

D. B. MACKIE and S. MICHELSON (Computer Sci. Corp., Mountain View, Calif.) Jul. 1978 37 p refs  
(NASA-TP-1267; A-7343) Avail: NTIS HC A03/MF A01  
CSCL 01C

CASCADE CONTROL, COMPUTERIZED SIMULATION, FORTRAN, ROTORCRAFT AIRCRAFT

**N78-30089\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EVALUATION OF SEVERAL SECONDARY TASKS IN THE DETERMINATION OF PERMISSIBLE TIME DELAYS IN SIMULATOR VISUAL AND MOTION CUES**

G. K. MILLER, JR. and D. R. RILEY Aug. 1978 68 p refs  
(NASA-TP-1214; L-12006) Avail: NTIS HC A04/MF A01  
CSCL 05H

AUDITORY TASKS, FLIGHT SIMULATORS, TIME LAG, TRACKING (POSITION), VISUAL TASKS

**N78-30090\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATOR STUDY OF THE EFFECT OF VISUAL-MOTION TIME DELAYS ON PILOT TRACKING PERFORMANCE WITH AN AUDIO SIDE TASK**

D. R. RILEY and G. K. MILLER, JR. Aug. 1978 74 p refs  
(NASA-TP-1216; L-11996) Avail: NTIS HC A04/MF A01  
CSCL 05H

AUDITORY TASKS, FLIGHT SIMULATORS, MOTION PERCEPTION, PILOT PERFORMANCE, TIME LAG, VISUAL PERCEPTION

**N79-14082\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**EFFECTS OF VISUAL AND MOTION SIMULATION CUEING SYSTEMS ON PILOT PERFORMANCE DURING TAKEOFFS WITH ENGINE FAILURES**

B. L. PARRIS and A. M. COOK Dec. 1978 85 p  
(NASA-TP-1365; A-7352) Avail: NTIS HC A05/MF A01  
CSCL 05H

CUES, DATA PROCESSING, ENGINE FAILURE, MOTION SIMULATORS, PILOT PERFORMANCE, VISUAL SIGNALS

**N79-14083\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DEVELOPMENT AND VALIDATION OF A PILOTED SIMULATION OF A HELICOPTER AND EXTERNAL SLING LOAD**

J. D. SHAUGHNESSY, T. N. DE AUX (Sperry Support Services, Hampton, Va.), and K. R. YENNI Jan. 1979 113 p refs  
(NASA-TP-1285; L-11925) Avail: NTIS HC A06/MF A01  
CSCL 01C

CH-54 HELICOPTER, FLIGHT SIMULATION, MATHEMATICAL MODELS, PILOT PERFORMANCE, SUSPENSION SYSTEMS (VEHICLES)

**N79-15938\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EXPERIMENTAL INVESTIGATION OF EFFECTS OF BLADE TIP GEOMETRY ON LOADS AND PERFORMANCE FOR AN ARTICULATED ROTOR SYSTEM**

W. H. WELLER (Army Aviation Research and Development Command, St. Louis, Mo.) Jan. 1979 79 p refs

(DA PROJ. 1L2-62209-AH-76)

(NASA-TP-1303; L-12153; AVRADCOM-TR-78-53) Avail: NTIS HC A05/MF A01 CSDL 01C

BLADE TIPS, ROTARY WINGS, WIND TUNNEL TESTS

**N79-29171\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FRICTION AND WEAR CHARACTERISTICS OF WIRE-BRUSH SKIDS**

R. C. DREHER Aug. 1979 30 p refs

(NASA-TP-1495; L-13095) Avail: NTIS HC A03/MF A01

CSDL 01C

FRICTION, SKIDDING, WEAR

**N79-30176\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**SIMILITUDE REQUIREMENTS AND SCALING RELATIONSHIPS AS APPLIED TO MODEL TESTING**

C. H. WOLOWICZ, J. S. BROWN, JR., and W. P. GILBERT Aug. 1979 64 p refs Prepared jointly with NASA. Langley Res. Center

(NASA-TP-1435; H-1022) Avail: NTIS HC A04/MF A01 CSDL 01C

AIRCRAFT MODELS, FLIGHT CHARACTERISTICS, PARAMETERIZATION, SCALE MODELS, SIMILITUDE LAW, WIND TUNNEL MODELS, WIND TUNNEL TESTS

**N79-33189\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF IMAGE TILT OF A VIRTUAL IMAGE DISPLAY ON SIMULATED TRANSPORT TOUCHDOWN PERFORMANCE**

R. V. PARRISH, W. M. KAHLRAUM, JR., and G. G. STEINMETZ Washington Oct. 1979 17 p refs

(NASA-TP-1520; L-13087) Avail: NTIS HC A02/MF A01

CSDL 01C

AIRCRAFT LANDING, DISPLAY DEVICES, FLIGHT SIMULATION, FLIGHT SIMULATORS, IMAGE CONVERTERS, LANDING SIMULATION, TOUCHDOWN

**N79-33191\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

**PROCESSING OF ON-BOARD RECORDED DATA FOR QUICK ANALYSIS OF AIRCRAFT PERFORMANCE**

N. H. MICHAUD Sep. 1979 326 p

(NASA-RP-1043) Avail: NTIS HC A15/MF A01 CSDL 01C

A system of independent computer programs for the processing of digitized pulse code modulated (PCM) and frequency modulated (FM) data is described. Information is stored in a set of random files and accessed to produce both statistical and graphical output. The software system is designed primarily to present these reports within a twenty-four hour period for quick analysis of the helicopter's performance. A.R.H.

**N80-10193\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTS IN SENSING TRANSIENT ROTATIONAL ACCELERATION CUES ON A FLIGHT SIMULATOR**

R. V. PARRISH Oct. 1979 24 p refs

(NASA-TP-1537; L-13030) Avail: NTIS HC A02/MF A01

CSDL 01C

ANGULAR ACCELERATION, FIGHTER AIRCRAFT, FLIGHT SIMULATION, MOTION PERCEPTION, ROLL

**N80-11068\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**WIND-TUNNEL/FLIGHT CORRELATION STUDY OF AERODYNAMIC CHARACTERISTICS OF A LARGE FLEXIBLE SUPERSONIC CRUISE AIRPLANE CXB-70-1). 1: WIND-TUNNEL TESTS OF A 0.03-SCALE MODEL AT MACH NUMBERS FROM 0.6 TO 2.53**

J. C. DAUGHERTY Nov. 1979 222 p refs

(NASA-TP-1514; A-7712) Avail: NTIS HC A10/MF A01 CSDL 01C

AERODYNAMIC CHARACTERISTICS, AIRCRAFT MODELS, B-70 AIRCRAFT, WIND TUNNEL TESTS

**N80-11069\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPLICATION OF MODIFIED PROFILE ANALYSIS TO FUNCTION TESTING OF SIMULATED CTOL TRANSPORT TOUCHDOWN-PERFORMANCE DATA**

R. V. PARRISH and B. T. MCKISSICK Nov. 1979 19 p refs

(NASA-TP-1541; L-13091) Avail: NTIS HC A02/MF A01

CSDL 01C

DISPLAY DEVICES, FLIGHT SIMULATION, PILOT PERFORMANCE, PROFILE METHOD (FORECASTING), TOUCHDOWN

**N80-12084\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**BEHAVIOR OF AIRCRAFT ANTISKID BRAKING SYSTEMS ON DRY AND WET RUNWAY SURFACES. A SLIP-VELOCITY-CONTROLLED, D SYSTEM**

S. M. STUBBS, J. A. TANNER, and E. G. SMITH Washington Dec. 1979 194 p refs

(NASA-TP-1051; L-11760) Avail: NTIS HC A09/MF A01

CSDL 01C

AIRCRAFT BRAKES, AIRCRAFT TIRES, ANTISKID DEVICES, RUNWAYS

**N80-13024\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPLICATION OF MODIFIED PROFILE ANALYSIS TO FUNCTION TESTING OF THE MOTION/NO-MOTION ISSUE IN AN AIRCRAFT GROUND-HANDLING SIMULATION**

R. V. PARRISH, B. T. MCKISSICK, and G. G. STEINMETZ Washington Dec. 1979 24 p refs

(NASA-TP-1540; L-13028) Avail: NTIS HC A02/MF A01

CSDL 01C

FLIGHT SIMULATORS, MAN MACHINE SYSTEMS, MOTION SIMULATORS, STATISTICAL ANALYSIS

**N80-13025\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYTICAL INVESTIGATION OF THE LANDING DYNAMICS OF A LARGE AIRPLANE WITH A LOAD-CONTROL SYSTEM IN THE MAIN LANDING GEAR**

J. R. MCGEHEE and H. D. CARDEN Dec. 1979 85 p refs

(NASA-TP-1555; L-13250) Avail: NTIS HC A05/MF A01

CSDL 01C

AIRCRAFT PARTS, COMPUTER PROGRAMMING, DYNAMIC CONTROL, IMPACT LOADS, LANDING GEAR

**N80-13026\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPLORATORY STUDY OF THE EFFECTS OF WING-LEADING-EDGE MODIFICATIONS ON THE STALL/SPIN BEHAVIOR OF A LIGHT GENERAL AVIATION AIRPLANE**

Dec. 1979 98 p refs

(NASA-TP-1589; L-13143) Avail: NTIS HC A05/MF A01

CSDL 01C

AERODYNAMIC STALLING, AIRCRAFT SPIN, GENERAL AVIATION AIRCRAFT, LEADING EDGES, LIGHT AIRCRAFT, WING PROFILES

## 05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

**N80-15068\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### **LOADING TESTS OF A WING STRUCTURE FOR A HYPERSONIC AIRCRAFT**

R. A. FIELDS, L. F. REARDON, and W. H. SIEGEL Jan. 1980 72 p refs  
(NASA-TP-1596; H-1046) Avail: NTIS HC A04/MF A01 CSCL 01C

HYPERSONIC AIRCRAFT, LOAD TESTS, SPOT WELDS, WING PANELS

**N80-15069\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **THE EFFECTS OF MOTION AND G-SEAT CUES ON PILOT SIMULATOR PERFORMANCE OF THREE PILOTING TASKS**

T. W. SHOWALTER and B. L. PARRIS Jan. 1980 45 p refs  
(NASA-TP-1601; A-7875) Avail: NTIS HC A03/MF A01 CSCL 01C

ACCELERATION (PHYSICS), C-135 AIRCRAFT, FLIGHT SIMULATION, MOTION SIMULATORS, PILOT PERFORMANCE

**N80-17060\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **COMPARISON OF ANALYTICAL AND FLIGHT TEST IDENTIFIED AERODYNAMIC DERIVATIVES FOR A TANDEM-ROTOR TRANSPORT HELICOPTER**

W. F. HODGE Feb. 1980 56 p refs  
(NASA-TP-1581; L-13228) Avail: NTIS HC A04/MF A01 CSCL 01C

AERODYNAMIC CHARACTERISTICS, CH-47 HELICOPTER, FLIGHT TESTS, STABILITY DERIVATIVES

**N80-18028\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **TERMINAL CONFIGURED VEHICLE PROGRAM: TEST FACILITIES GUIDE**

Washington 1980 67 p refs  
(NASA-SP-435) Avail: NTIS HC A04/MF A01 CSCL 01C

The terminal configured vehicle (TCV) program was established to conduct research and to develop and evaluate aircraft and flight management system technology concepts that will benefit conventional take off and landing operations in the terminal area. Emphasis is placed on the development of operating methods for the highly automated environment anticipated in the future. The program involves analyses, simulation, and flight experiments. Flight experiments are conducted using a modified Boeing 737 airplane equipped with highly flexible display and control equipment and an aft flight deck for research purposes. The experimental systems of the Boeing 737 are described including the flight control computer systems, the navigation/guidance system, the control and command panel, and the electronic display system. The ground based facilities used in the program are described including the visual motion simulator, the fixed base simulator, the verification and validation laboratory, and the radio frequency anechoic facility. A.W.H.

**N80-21317\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SIMULATOR STUDY OF THE EFFECT OF CONTROL-SYSTEM TIME DELAYS ON THE OCCURRENCE OF PILOT-INDUCED OSCILLATIONS AND ON PILOT TRACKING PERFORMANCE WITH A SPACE-SHUTTLE-ORBITER CONFIGURATION**

D. R. RILEY and G. K. MILLER, JR. Apr. 1980 91 p refs  
(NASA-TP-1588; L-13131) Avail: NTIS HC A05/MF A01 CSCL 01C

APPROACH AND LANDING TESTS (STS), HUMAN FACTORS ENGINEERING, SPACE SHUTTLE ORBITERS, SPACE TRANSPORTATION SYSTEM, SPACECRAFT CONTROL

**N80-21318\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PARAMETRIC STUDY OF VARIATION IN CARGO-AIRCRAFT PERFORMANCE RELATED TO PROGRESSION FROM CURRENT TO SPANLOADER DESIGNS**

T. A. TOLL Washington Apr. 1980 53 p refs  
(NASA-TP-1625; L-13208) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT DESIGN, AIRCRAFT PERFORMANCE, CARGO AIRCRAFT, PAYLOAD MASS RATIO, WING LOADING

**N80-24296\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **MEASUREMENT OF AIRCRAFT SPEED AND ALTITUDE**

W. GRACEY May 1980 311 p refs  
(NASA-RP-1046; L-12610) Avail: NTIS HC A14/MF A01 CSCL 01C

Problems involved in measuring speed and altitude with pressure-actuated instruments (altimeter, airspeed indicator, true-airspeed indicator, Machmeter, and vertical-speed indicator) are examined. Equations relating total pressure and static pressure to the five flight quantities are presented, and criteria for the design of total and static pressure tubes are given. Calibrations of typical static pressure installations (fuselage nose, wing tip, vertical fin, and fuselage vent) are presented, various methods for flight calibration of these installations are described, and the calibration of a particular installation by two of the methods is described in detail. Equations are given for estimating the effects of pressure lag and leaks. Test procedures for the laboratory calibration of the five instruments are described, and accuracies of mechanical and electrical instruments are presented. Operational use of the altimeter for terrain clearance and vertical separation of aircraft is discussed, along with flight technical errors and overall altitude errors of aircraft in cruise operations. Altitude-measuring techniques based on a variety of properties of the Earth and the atmosphere are included. Two appendixes present airspeed and altitude tables and sample calculations for determining the various flight parameters from measured total and static pressures. R.E.S.

**N80-25318\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **LARGE-SCALE WIND-TUNNEL TESTS OF INVERTING FLAPS ON A STOL UTILITY AIRCRAFT MODEL**

T. W. FEISTEL and J. P. MORELLI Jun. 1980 56 p refs  
(NASA-TP-1696; AVRADCOM-TM-80-A-1; A-7061) Avail: NTIS HC A04/MF A01 CSCL 01C

FLAPS (CONTROL SURFACES), LIFT AUGMENTATION, SHORT TAKEOFF AIRCRAFT, WIND TUNNEL TESTS

**N80-25321\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EXPERIMENTAL AND ANALYTICAL TRANSONIC FLUTTER CHARACTERISTICS OF A GEARED-ELEVATOR CONFIGURATION**

C. L. RUHLIN, R. V. DOGGETT, JR., and R. A. GREGORY (Boeing Commercial Airplane Co., Seattle) Jun. 1980 30 p refs  
Revised  
(NASA-TP-1666; L-13544) Avail: NTIS HC A03/MF A01 CSCL 01C

ELEVATORS (CONTROL SURFACES), FLUTTER ANALYSIS, HORIZONTAL TAIL SURFACES, TRANSONIC FLUTTER

**N80-29287\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **WIND-TUNNEL EXPERIMENTS ON DIVERGENCE OF FORWARD-SWEPT WINGS**

R. H. RICKETTS and R. V. DOGGETT, JR. Aug. 1980 49 p refs  
(NASA-TP-1685; L-13549) Avail: NTIS HC A03/MF A01 CSCL 01C

AEROELASTICITY, FLUTTER, PREDICTION ANALYSIS TECHNIQUES, SWEPT FORWARD WINGS, WIND TUNNEL TESTS

## 05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

**N80-30296\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **CRASH TESTS OF FOUR IDENTICAL HIGH-WING SINGLE-ENGINE AIRPLANES**

V. L. VAUGHAN, JR. and R. J. HAYDUK Aug. 1980 70 p refs

(NASA-TP-1699; L-13076) Avail: NTIS HC A04/MF A01

CSCL 01C

ATTITUDE (INCLINATION), CRASH LANDING, DAMAGE ASSESSMENT, FLIGHT PATHS, IMPACT DAMAGE, IMPACT TESTS

**N81-12066\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### **A MODIFIED T-VALUE METHOD FOR SELECTION OF STRAIN GAGES FOR MEASURING LOADS ON A LOW ASPECT RATIO WING**

M. H. TANG and R. G. SHELDON Nov. 1980 54 p refs

(NASA-TP-1748; H-1108) Avail: NTIS HC A04/MF A01

CSCL 01C

GRAPHS (CHARTS), LOAD DISTRIBUTION (FORCES), STRAIN GAGES, TABLES (DATA)

**N81-16039\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **USE OF CONSTRAINED OPTIMIZATION IN THE CONCEPTUAL DESIGN OF A MEDIUM-RANGE SUBSONIC TRANSPORT**

S. M. SLIWA Dec. 1980 38 p refs

(NASA-TP-1762; L-13946) Avail: NTIS HC A03/MF A01

CSCL 01C

COST ANALYSIS, DESIGN ANALYSIS, NONLINEAR PROGRAMMING, OPTIMIZATION, TRANSPORT AIRCRAFT

**N81-16040\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **SAMPLE DATA EFFECTS OF HIGH-PASS FILTERS**

D. O. CHIN Jan. 1981 32 p refs

(NASA-TP-1797; A-8361) Avail: NTIS HC A03/MF A01

CSCL 01C

DATA PROCESSING EQUIPMENT, HIGH PASS FILTERS, MATHEMATICAL MODELS, MOTION SIMULATORS

**N81-22039\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **KINEMATIC PROPERTIES OF THE HELICOPTER IN COORDINATED TURNS**

R. T. N. CHEN and J. A. JESKE Apr. 1981 41 p refs

(NASA-TP-1773; A-8399) Avail: NTIS HC A03/MF A01

CSCL 01C

ANGLE OF ATTACK, HELICOPTERS, KINEMATIC EQUATIONS, PITCHING MOMENTS, ROLL, SIDESLIP

**N81-24048\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### **APPLICATION OF A PERFORMANCE MODELING TECHNIQUE TO AN AIRPLANE WITH VARIABLE SWEEP WINGS**

P. C. REDIN May 1981 33 p refs

(NASA-TP-1855; H-1131) Avail: NTIS HC A03/MF A01

CSCL 01C

AIRCRAFT MANEUVERS, AIRCRAFT PERFORMANCE, COMPUTERIZED SIMULATION, F-111 AIRCRAFT

**N81-30112\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **BEHAVIOR OF AIRCRAFT ANTISKID BRAKING SYSTEMS ON DRY AND WET RUNWAY SURFACES: HYDROMECHANICALLY CONTROLLED SYSTEM**

J. A. TANNER, S. M. STUBBS, and E. G. SMITH Aug. 1981 176 p refs

(NASA-TP-1877; L-14549) Avail: NTIS HC A09/MF A01

CSCL 01C

AIRCRAFT BRAKES, AIRCRAFT TIRES, ANTISKID DEVICES, RUNWAY CONDITIONS

**N81-31185\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **VEHICLE CONCEPTS AND TECHNOLOGY REQUIREMENTS FOR BUOYANT HEAVY-LIFT SYSTEMS**

M. D. ARDEMA Sep. 1981 18 p refs

(NASA-TP-1921; A-8022) Avail: NTIS HC A02/MF A01

CSCL 01C

AIRCRAFT DESIGN, AIRSHIPS, COST ANALYSIS, HEAVY LIFT HELICOPTERS, TECHNOLOGY ASSESSMENT

**N82-11050\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PARAMETRIC STUDY OF MICROWAVE-POWERED HIGH-ALTITUDE AIRPLANE PLATFORMS DESIGNED FOR LINEAR FLIGHT**

C. E. K. MORRIS, JR. Nov. 1981 74 p refs

(NASA-TP-1918; L-14606) Avail: NTIS HC A04/MF A01

CSCL 01C

FLYING PLATFORMS, HORIZONTAL FLIGHT, MICROWAVE TRANSMISSION, PARAMETER IDENTIFICATION, PERFORMANCE PREDICTION, REMOTELY PILOTED VEHICLES

**N82-16068\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SPIN TESTS OF A SINGLE-ENGINE, HIGH-WING LIGHT AIRPLANE**

E. C. STEWART, W. T. SUIT, T. M. MOUL, and P. W. BROWN

Jan. 1982 93 p refs

(NASA-TP-1927; L-14305) Avail: NTIS HC A05/MF A01

CSCL 01C

AERODYNAMIC STALLING, GENERAL AVIATION AIRCRAFT, SPIN TESTS

**N82-18204\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **DYNAMICS OF AIRCRAFT ANTISKID BRAKING SYSTEMS**

J. A. TANNER, S. M. STUBBS, R. C. DREHER, and E. G. SMITH

Feb. 1982 100 p refs

(NASA-TP-1959; L-14788) Avail: NTIS HC A05/MF A01

CSCL 01C

AIRCRAFT BRAKES, AIRCRAFT TIRES, ANTISKID DEVICES, BRAKING, DYNAMIC RESPONSE, TORQUE, WHEEL BRAKES

**N82-23244\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PLANAR EQUATIONS OF ROLLOUT MOTION FOR AN AIRCRAFT WITH FREE OR STEERABLE LANDING GEARS**

R. K. SLEEPER and E. G. SMITH May 1982 54 p refs

(NASA-TP-1984; L-11689; NAS 1.60:1984) Avail: NTIS HC

A04/MF A01 CSCL 01C

AIRCRAFT LANDING, EQUATIONS OF MOTION, LANDING GEAR, ROLL

**N82-24193\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **TIRE TREAD TEMPERATURES DURING ANTISKID BRAKING AND CORNERING ON A DRY RUNWAY**

J. A. TANNER, R. C. DREHER, S. M. STUBBS, and E. G. SMITH

May 1982 57 p refs

(NASA-TP-2009; L-15110; NAS 1.60:2009) Avail: NTIS HC

04/MF A01 CSCL 01C

AIRCRAFT BRAKES, AIRCRAFT TIRES, BRAKING, FRICTION, SKIDDING, SURFACE TEMPERATURE, TREADS

## 05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

**N82-29311\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **ESTABLISHMENT OF A ROTOR MODEL BASIS**

R. E. MCFARLAND Jun. 1982 93 p refs Prepared in cooperation with Army Aviation Research and Development Command, Moffett Field, Calif.

(NASA-TP-2026; A-8605; NAS 1.60:2026;

AVRADCOM-TR-81-A-14) Avail: NTIS HC A05/MF A01 CSCL 01C

ALGORITHMS, ERROR ANALYSIS, MATHEMATICAL MODELS, ROTOR AERODYNAMICS, ROTOR BLADES (TURBOMACHINERY)

**N82-31321\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EXPERIMENTAL INVESTIGATION OF ACTIVE LOADS CONTROL FOR AIRCRAFT LANDING GEAR**

J. R. MCGHEE and R. C. DREHER Aug. 1982 72 p refs

(NASA-TP-2042; L-15224; NAS 1.60:2042) Avail: NTIS HC

A04/MF A01 CSCL 01C

DYNAMIC LOADS, HYDRAULIC CONTROL, LANDING GEAR, VIBRATORY LOADS

**N82-32350\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SOME DESIGN CONSIDERATIONS FOR SOLAR-POWERED AIRCRAFT**

W. H. PHILLIPS Jun. 1980 60 p refs

(NASA-TP-1675; L-13562; NAS 1.60:1675) Avail: NTIS HC

A04/MF A01 CSCL 01C

AIRCRAFT ENGINES, AIRCRAFT PERFORMANCE, SOLAR POWERED AIRCRAFT, SOLAR PROPULSION

**N83-18714\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **THE VIBRATION CHARACTERISTICS OF A COUPLED HELICOPTER ROTOR-FUSELAGE BY A FINITE ELEMENT ANALYSIS**

M. J. RUTKOWSKI 1983 76 p refs Prepared in cooperation with Army Research and Technology Labs.

(NASA-TP-2118; A-9053; NAS 1.60:2118;

AVRADCOM-TR-82-A-15) Avail: NTIS HC A05/MF A01 CSCL 01C

FUSELAGES, HELICOPTERS, HOVERING, ROTARY WINGS, VIBRATION EFFECTS

**N83-18715\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **COMPARISON OF SIMULATOR FIDELITY MODEL PREDICTIONS WITH IN-SIMULATOR EVALUATION DATA**

R. V. PARRISH, B. T. MCKISSICK, and B. R. ASHWORTH Feb. 1983 39 p refs

(NASA-TP-2106; L-15519; NAS 1.60:2106) Avail: NTIS HC

A03/MF A01 CSCL 01C

DIGITAL SYSTEMS, FEEDBACK CONTROL, FLIGHT SIMULATORS, PILOT TRAINING, REAL TIME OPERATION

**N83-20931\*#** National Aeronautics and Space Administration. Washington, D.C.

### **SMALL TRANSPORT AIRCRAFT TECHNOLOGY**

L. J. WILLIAMS 1983 118 p refs

(NASA-SP-460; NAS 1.21:460; LC-82-600387) Avail: NTIS MF

A01; SOD HC \$5.00 CSCL 01C

Information on commuter airline trends and aircraft developments is provided to upgrade the preliminary findings of a NASA-formed small transport aircraft technology (STAT) team, established to determine whether the agency's research and development programs could help commuter aircraft manufacturers solve technical problems related to passenger acceptance and use of 19- to 50-passenger aircraft. The results and conclusions of the full set of completed STAT studies are presented. These studies were performed by five airplane manufacturers, five engine manufacturers, and two propeller manufacturers. Those portions

of NASA's overall aeronautics research and development programs which are applicable to commuter aircraft design are summarized. Areas of technology that might beneficially be expanded or initiated to aid the US commuter aircraft manufacturers in the evolution of improved aircraft for the market are suggested. A.R.H.

**N83-22191\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EVALUATION OF G SEAT AUGMENTATION OF FIXED-BASE/MOVING BASE SIMULATION FOR TRANSPORT LANDINGS UNDER TWO VISUALLY IMPOSED RUNWAY WIDTH CONDITIONS**

R. V. PARRISH and G. G. STEINMETZ Apr. 1983 25 p refs

(NASA-TP-2135; L-15540; NAS 1.60:2135) Avail: NTIS HC

A02/MF A01 CSCL 01C

AIRCRAFT LANDING, LANDING SIMULATION, MOTION SIMULATORS, RUNWAYS, SEATS, TRANSPORT AIRCRAFT

**N83-22192\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **MOTION/VISUAL CUEING REQUIREMENTS FOR VORTEX ENCOUNTERS DURING SIMULATED TRANSPORT VISUAL APPROACH AND LANDING**

R. V. PARRISH and R. L. BOWLES Apr. 1983 23 p refs

(NASA-TP-2136; L-15544; NAS 1.60:2136) Avail: NTIS HC

A02/MF A01 CSCL 17G

CUES, DISPLAY DEVICES, FLIGHT TESTS, VISUAL CONTROL, VISUAL PERCEPTION, VORTEX AVOIDANCE, VORTICES

**N83-27977\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **A CONCEPTUAL FRAMEWORK FOR USING DOPPLER RADAR ACQUIRED ATMOSPHERIC DATA FOR FLIGHT SIMULATION**

W. CAMPBELL Jun. 1983 16 p refs

(NASA-TP-2192; NAS 1.60:2192) Avail: NTIS HC A02/MF A01

CSCL 01C

AERODYNAMIC LOADS, ATMOSPHERIC TURBULENCE, DOPPLER RADAR, FLIGHT SIMULATION, STABILITY DERIVATIVES, WIND PROFILES

**N83-31596\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SERVICE LIFE EVALUATION OF RIGID EXPLOSIVE TRANSFER LINES**

L. J. BEMENT, E. G. KAYSER (NSWC, Silver Spring, Md.), and M. L. SCHIMMEL (McDonnell Aircraft Co., St. Louis) Aug. 1983

56 p refs Original contains color illustrations

(NASA-TP-2143; L-15558; NAS 1.60:2143) Avail: NTIS HC

A04/MF A01 CSCL 01C

ESCAPE SYSTEMS, EXPLOSIVES, FIGHTER AIRCRAFT, MILITARY OPERATIONS, SERVICE LIFE, TRANSMISSION LINES

**N83-34935\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **BRAKING AND CORNERING STUDIES ON AN AIR CUSHION LANDING SYSTEM**

R. H. DAUGHERTY Sep. 1983 25 p refs

(NASA-TP-2196; L-15640; NAS 1.60:2196) Avail: NTIS HC

A02/MF A01 CSCL 01C

AERODYNAMIC CHARACTERISTICS, AIR CUSHION LANDING SYSTEMS, BRAKING, STEERING

**N84-15144\*#** National Aeronautics and Space Administration. Washington, D.C.

### **FUEL ECONOMY IN AVIATION**

J. L. ETHELL 1983 117 p Original contains color illustrations

(NASA-SP-462; NAS 1.21:462) Avail: NTIS MF A01; SOD HC

\$15.00 as 033-000-00899-6 CSCL 01C

Engine component improvement, an energy efficient engine, advanced turboprops, composite structures, energy efficient transport, and laminar flow control are discussed. N.W.



**N84-17175\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FRICION AND WEAR BEHAVIOR OF ALUMINUM AND COMPOSITE AIRPLANE SKINS**

K. E. JACKSON Feb. 1984 28 p refs Prepared in cooperation with Army Research and Technology Labs., Fort Eustis, Va. (DA PROJ. 1L1-61102-AH-45)

(NASA-TP-2262; NAS 1.60:2262; AVSCOM-TR-83-B-7; L-15697)

Avail: NTIS HC A03/MF A01 CSCL 01C

AIRCRAFT CONSTRUCTION MATERIALS, ALUMINUM ALLOYS, FRICTION, GRAPHITE-EPOXY COMPOSITES, SKIN (STRUCTURAL MEMBER), WEAR

**N84-18189\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF MOTION BASE AND G-SEAT CUEING OF SIMULATOR PILOT PERFORMANCE**

B. R. ASHWORTH, B. T. MCKISSICK, and R. V. PARRISH Mar. 1984 26 p refs

(NASA-TP-2247; L-15559; NAS 1.60:2247) Avail: NTIS HC

A03/MF A01 CSCL 051

ACCELERATION (PHYSICS), CUES, FLIGHT SIMULATION, MOTION SIMULATORS, PILOT PERFORMANCE, SEATS

**N84-19333\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**AN ASSESSMENT OF THE CAPABILITY TO CALCULATE TILTING PROP-ROTOR AIRCRAFT PERFORMANCE, LOADS AND STABILITY**

W. JOHNSON Mar. 1984 25 p refs

(NASA-TP-2291; A-9411; NAS 1.60:2291) Avail: NTIS HC

A02/MF A01 CSCL 01C

AEROELASTICITY, AIRCRAFT STABILITY, LOADS (FORCES), TILT ROTOR RESEARCH AIRCRAFT PROGRAM, XV-15 AIRCRAFT

**N84-31111\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**RESULTS OF THE FIRST COMPLETE STATIC CALIBRATION OF THE RSRA ROTOR-LOAD-MEASUREMENT SYSTEM**

C. W. ACREE, JR. Aug. 1984 57 p refs

(NASA-TP-2327; A-9593; NAS 1.60:2327) Avail: NTIS HC

A04/MF A01 CSCL 01C

CALIBRATING, ERRORS, HYSTERESIS, ROTOR SYSTEMS RESEARCH AIRCRAFT, STATIC LOADS

**N84-32378\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VALIDATION OF AN ACTIVE GEAR, FLEXIBLE AIRCRAFT TAKE-OFF AND LANDING ANALYSIS (AGFATL)**

J. R. MCGHEE Sep. 1984 31 p refs

(NASA-TP-2353; L-15807; NAS 1.60:2353) Avail: NTIS HC

A03/MF A01 CSCL 01C

ACTIVE CONTROL, AIRFRAMES, COMPUTER PROGRAMS, LANDING GEAR, STRUCTURAL FAILURE, TAKEOFF

**N85-12884\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**FLIGHT AND WIND-TUNNEL COMPARISONS OF THE INLET-AIRFRAME INTERACTION OF THE F-15 AIRPLANE**

L. D. WEBB, D. ANDRIYICH-VARDA, and S. A. WHITMORE Nov. 1984 35 p refs

(NASA-TP-2374; H-1175; NAS 1.60:2374) Avail: NTIS HC

A03/MF A01 CSCL 01C

FLIGHT TESTS, FORCE DISTRIBUTION, INLET AIRFRAME CONFIGURATIONS, PRESSURE DISTRIBUTION, WIND TUNNEL TESTS

**N85-19979\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PARAMETRIC STUDY OF A CANARD-CONFIGURED TRANSPORT USING CONCEPTUAL DESIGN OPTIMIZATION**

P. D. ARBUCKLE and S. M. SLIWA Mar. 1985 28 p refs (NASA-TP-2400; L-15856; NAS 1.60:2400) Avail: NTIS HC

A03/MF A01 CSCL 01C

AERODYNAMIC CONFIGURATIONS, AIRCRAFT DESIGN, CANARD CONFIGURATIONS, TANDEM WING AIRCRAFT

**N85-23753\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RELATIVE CONTROL EFFECTIVENESS TECHNIQUE WITH APPLICATION TO AIRPLANE CONTROL COORDINATION**

F. J. LALLMAN Apr. 1985 18 p refs

(NASA-TP-2416; L-15864; NAS 1.60:2416) Avail: NTIS HC

A02/MF A01 CSCL 01C

AIRCRAFT CONTROL, AIRCRAFT STABILITY, DIRECTIONAL CONTROL, LATERAL CONTROL, OPTIMIZATION, THRUST VECTOR CONTROL

**N85-25248\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHT INVESTIGATION OF STALL, SPIN AND RECOVERY CHARACTERISTICS OF A LOW-WING, SINGLE-ENGINE, T-TAIL LIGHT AIRPLANE**

H. P. STOUGH, III, D. J. DICARLO, and J. M. PATTON, JR. May 1985 98 p refs

(NASA-TP-2427; L-15868; NAS 1.60:2427) Avail: NTIS HC

A05/MF A01 CSCL 01C

AERODYNAMIC STALLING, AERONAUTICS, AIRCRAFT SPIN, ANGULAR MOMENTUM, SPIN DYNAMICS

**N85-33116\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ENERGY EFFICIENT TRANSPORT TECHNOLOGY: PROGRAM SUMMARY AND BIBLIOGRAPHY**

D. B. MIDDLETON, D. W. BARTLETT, and R. V. HOOD Sep. 1985 54 p refs

(NASA-RP-1135; L-15921; NAS 1.61:1135) Avail: NTIS HC

A04/MF A01 CSCL 01C

The Energy Efficient Transport (EET) Program began in 1976 as an element of the NASA Aircraft Energy Efficiency (ACEE) Program. The EET Program and the results of various applications of advanced aerodynamics and active controls technology (ACT) as applicable to future subsonic transport aircraft are discussed. Advanced aerodynamics research areas included high aspect ratio supercritical wings, winglets, advanced high lift devices, natural laminar flow airfoils, hybrid laminar flow control, nacelle aerodynamic and inertial loads, propulsion/airframe integration (e.g., long duct nacelles) and wing and empennage surface coatings. In depth analytical/trade studies, numerous wind tunnel tests, and several flight tests were conducted. Improved computational methodology was also developed. The active control functions considered were maneuver load control, gust load alleviation, flutter mode control, angle of attack limiting, and pitch augmented stability. Current and advanced active control laws were synthesized and alternative control system architectures were developed and analyzed. Integrated application and fly by wire implementation of the active control functions were design requirements in one major subprogram. Additional EET research included interdisciplinary technology applications, integrated energy management, handling qualities investigations, reliability calculations, and economic evaluations related to fuel savings and cost of ownership of the selected improvements. Author

## 05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

**N86-13316\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ABRASION BEHAVIOR OF ALUMINUM AND COMPOSITE SKIN COUPONS, STIFFENED SKINS AND STIFFENED PANELS REPRESENTATIVE OF TRANSPORT AIRPLANE STRUCTURES**  
K. E. JACKSON Nov. 1985 33 p refs

(DA PROJ. 1L1-61102-AH-45)

(NASA-TP-2520; L-16018; NAS 1.60:2520; AVSCOM-TR-85-B-7)

Avail: NTIS HC A03/MF A01 CSCL 01C

ABRASION, ALUMINUM, CRASH LANDING, GRAPHITE-EPOXY COMPOSITES, PANELS, RUNWAYS, SKID LANDINGS, SKIN (STRUCTURAL MEMBER), TRANSPORT AIRCRAFT

**N86-15280\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**ROTORCRAFT DYNAMICS 1984**

Nov. 1985 497 p refs Proceedings of the 2d Decennial Specialists' Meeting on Rotorcraft Dynamics, Moffett Field, Calif., 7-9 Nov. 1984; sponsored by NASA. Ames Research Center and the American Helicopter Society

(NASA-CP-2400; REPT-85122; NAS 1.55:2400) Avail: NTIS HC A21/MF A01 CSCL 01C

AERODYNAMIC LOADS, AERODYNAMIC STABILITY, HELICOPTER DESIGN, HELICOPTER PERFORMANCE, ROTARY WING AIRCRAFT, VIBRATION

**N86-30720\*#** National Aeronautics and Space Administration, Washington, D.C.

**NASA AND GENERAL AVIATION**

J. L. ETHELL 1986 140 p Original contains color illustrations (NASA-SP-485; NAS 1.21:485) Avail: SOD HC \$6.50 as 033-000-00984-4; NTIS MF A01 CSCL 01C

General aviation remains the single most misunderstood sector of aeronautics in the United States. A detailed look at how general aviation functions and how NASA helps keep it on the cutting edge of technology in airfoils, airframes, commuter travel, environmental concerns, engines, propellers, air traffic control, agricultural development, electronics, and safety is given. Author

**N86-30721\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**IMPACT DATA FROM A TRANSPORT AIRCRAFT DURING A CONTROLLED IMPACT DEMONSTRATION**

E. L. FASANELLA (PRC Kentron, Inc., Hampton, Va.), E. ALFARO-BOU, and R. J. HAYDUK Sep. 1986 88 p (NASA-TP-2589; L-16125; NAS 1.60:2589) Avail: NTIS HC A05/MF A01 CSCL 01B

AIRCRAFT ACCIDENTS, BOEING 720 AIRCRAFT, CRASHES, CRASHWORTHINESS, IMPACT LOADS, IMPACT TESTS, STRUCTURAL STABILITY

**N78-20128\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A ROTOR-MOUNTED DIGITAL INSTRUMENTATION SYSTEM FOR HELICOPTER BLADE FLIGHT RESEARCH MEASUREMENTS**

V. H. KNIGHT, JR., W. S. HAYWOOD, JR., and M. L. WILLIAMS Apr. 1978 49 p refs

(NASA-TP-1146; L-11956) Avail: NTIS HC A03/MF A01 CSCL 01D

DIGITAL SYSTEMS, FLIGHT INSTRUMENTS, FLIGHT TESTS, PRESSURE SENSORS, ROTARY WINGS

**N78-31101\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATION AND FLIGHT EVALUATION OF A HEAD-UP LANDING AID FOR GENERAL AVIATION**

R. L. HARRIS, SR., M. W. GOODE, and K. R. YENNI Sep. 1978 38 p refs

(NASA-TP-1276; L-12197) Avail: NTIS HC A03/MF A01 CSCL 01D

FLIGHT SIMULATION, GENERAL AVIATION AIRCRAFT, HEAD-UP DISPLAYS, LANDING AIDS

**N79-23081\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MINIATURE FLOW-DIRECTION AND AIRSPEED SENSOR FOR AIRPLANES AND RADIO CONTROLLED MODELS IN SPIN STUDIES**

D. D. KERSHNER May 1979 27 p refs

(NASA-TP-1467; L-12812) Avail: NTIS HC A03/MF A01 CSCL 01D

AIRCRAFT EQUIPMENT, AIRSPEED, ANGLE OF ATTACK, FLOW DIRECTION INDICATORS, RADIO CONTROL, REMOTE SENSORS

**N79-33201\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**A REVIEW OF SOME HEAD-UP DISPLAY FORMATS**

J. M. NAISH (NAS-NRC) Oct. 1979 51 p refs

(NASA-TP-1499; A-7708; HUD-4) Avail: NTIS HC A04/MF A01 CSCL 01D

FLIGHT INSTRUMENTS, FLIGHT PATHS, FLIGHT TESTS, HEAD-UP DISPLAYS

**N80-23304\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**WIND TUNNEL INVESTIGATION OF AN ALL FLUSH ORIFICE AIR DATA SYSTEM FOR A LARGE SUBSONIC AIRCRAFT**

T. J. LARSON, S. G. FLECHNER, and P. M. SIEMERS, III May 1980 97 p refs

(NASA-TP-1642; H-1085) Avail: NTIS HC A05/MF A01 CSCL 01D

AIR DATA SYSTEMS, C-135 AIRCRAFT, DATA ACQUISITION, ORIFICES, PRESSURE MEASUREMENT, SUBSONIC AIRCRAFT

**N80-27360\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHT INVESTIGATION OF COCKPIT-DISPLAYED TRAFFIC INFORMATION UTILIZING CODED SYMBOLOGY IN AN ADVANCED OPERATIONAL ENVIRONMENT**

T. S. ABBOTT, G. C. MOEN, L. H. PERSON, JR., G. L. KEYSER, JR., K. R. YENNI, and J. F. GARREN, JR. Jul. 1980 31 p refs

(DA PROJ. 1L2-62209-AH-76)

(NASA-TP-1684; AVRADCOM-TR-80-B-4; L-13584) Avail: NTIS HC A03/MF A01 CSCL 01D

AIR TRAFFIC CONTROL, COLLISION AVOIDANCE, DISPLAY DEVICES, SYMBOLS

## 06

### AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

**N78-13054\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHT-TEST EVALUATION OF TWO ELECTRONIC DISPLAY FORMATS FOR APPROACH TO LANDING UNDER INSTRUMENT CONDITIONS**

S. A. MORELLO, C. E. KNOX, and G. G. STEINMETZ Dec. 1977 33 p refs

(NASA-TP-1085; L-11867) Avail: NTIS HC A03/MF A01 CSCL 01D

DISPLAY DEVICES, FLIGHT TESTS, INSTRUMENT LANDING SYSTEMS

**N80-28349\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**AN EXPERIMENTAL EVALUATION OF HEAD-UP DISPLAY FORMATS**

J. M. NAISH and D. L. MILLER (Informatics, Inc., Palo Alto, Calif.)  
Jul. 1980 78 p refs  
(NASA-TP-1550; A-7970) Avail: NTIS HC A05/MF A01 CSCL 01D

COMPUTERIZED SIMULATION, FLIGHT SIMULATION, HEAD-UP DISPLAYS, HUMAN FACTORS ENGINEERING

**N80-30305\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATION DEVELOPMENT AND EVALUATION OF AN IMPROVED LONGITUDINAL VELOCITY VECTOR CONTROL WHEEL STEERING MODE AND ELECTRONIC DISPLAY FORMAT**

G. G. STEINMETZ Aug. 1980 97 p refs  
(NASA-TP-1664; L-13435) Avail: NTIS HC A05/MF A01 CSCL 01D

COMPUTERIZED SIMULATION, DISPLAY DEVICES, VECTORS (MATHEMATICS), VELOCITY

**N80-32389\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**USE OF NOSE CAP AND FUSELAGE PRESSURE ORIFICES FOR DETERMINATION OF AIR DATA FOR SPACE SHUTTLE ORBITER BELOW SUPERSONIC SPEEDS**

T. J. LARSON and P. M. SIEMERS, III (NASA, Langley Research Center) Sep. 1980 128 p refs  
(NASA-TP-1643; H-1096) Avail: NTIS HC A07/MF A01 CSCL 01D

ORIFICE FLOW, PRESSURE GRADIENTS, SPACE SHUTTLE ORBITERS, SUBSONIC SPEED, TRANSONIC SPEED, WIND TUNNEL TESTS

**N80-33404\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DEVELOPMENT AND TEST RESULTS OF A FLIGHT MANAGEMENT ALGORITHM FOR FUEL CONSERVATIVE DESCENTS IN A TIME-BASED METERED TRAFFIC ENVIRONMENT**

C. E. KNOX and D. G. CANNON (Boeing Commercial Airplane Co., Seattle) Oct. 1980 50 p refs  
(NASA-TP-1717) Avail: NTIS HC A03/MF A01 CSCL 01D

AIR TRAFFIC CONTROL, ALGORITHMS, COMPUTER PROGRAMS, COMPUTERIZED SIMULATION, FLIGHT TESTS, FUEL CONSUMPTION

**N81-13958\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EVALUATION OF A COMPUTER-GENERATED PERSPECTIVE TUNNEL DISPLAY FOR FLIGHT PATH FOLLOWING**

A. J. GRUNWALD, J. B. ROBERTSON, and J. J. HATFIELD Dec. 1980 100 p refs  
(NASA-TP-1736; L-13253) Avail: NTIS HC A06/MF A01 CSCL 01D

AIRCRAFT EQUIPMENT, DISPLAY DEVICES, EVALUATION, FLIGHT CONTROL, PILOT PERFORMANCE, TRAJECTORY OPTIMIZATION

**N81-14997\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATOR STUDY OF CONVENTIONAL GENERAL AVIATION INSTRUMENT DISPLAYS IN PATH-FOLLOWING TASKS WITH EMPHASIS ON PILOT-INDUCED OSCILLATIONS**

J. J. ADAMS Dec. 1980 55 p refs  
(NASA-TP-1776; L-13785) Avail: NTIS HC A04/MF A01 CSCL 01D

AIRCRAFT INSTRUMENTS, FLIGHT SIMULATION, LATERAL CONTROL, OSCILLATIONS, PILOT PERFORMANCE, TRACKING (POSITION)

**N81-20074\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**DIVERSITY TECHNIQUES FOR OMNIDIRECTIONAL TELEMETRY COVERAGE OF THE HIMAT RESEARCH VEHICLE**

P. F. HARNEY Mar. 1981 18 p refs  
(NASA-TP-1830; H-1133) Avail: NTIS HC A02/MF A01 CSCL 09F

ANTENNA RADIATION PATTERNS, COMMAND AND CONTROL, OMNIDIRECTIONAL ANTENNAS, RECEPTION DIVERSITY, REMOTELY PILOTED VEHICLES, TELEMETRY

**N81-24058\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHT EVALUATION OF A SIMPLE TOTAL ENERGY-RATE SYSTEM WITH POTENTIAL WIND-SHEAR APPLICATION**

A. J. OSTROFF, R. M. HUESCHEN, R. F. HELLBAUM, and J. F. CREEDON May 1981 52 p refs  
(NASA-TP-1854; L-14209) Avail: NTIS HC A04/MF A01 CSCL 01D

AIRCRAFT INSTRUMENTS, KINETIC ENERGY, POTENTIAL ENERGY, WIND SHEAR

**N81-26144\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**SUBSONIC TESTS OF AN ALL-FLUSH-PRESSURE-ORIFICE AIR DATA SYSTEM**

T. J. LARSON and P. M. SIEMERS, III (NASA, Langley Research Center) Jun. 1981 50 p refs Presented at the 1980 Air Data Systems Conf.

(NASA-TP-1871; H-1122) Avail: NTIS HC A03/MF A01 CSCL 01D

AIR DATA SYSTEMS, AIRSPEED, FLIGHT TESTS, ORIFICES, PRESSURE DISTRIBUTION, SUBSONIC SPEED, WIND TUNNEL TESTS

**N81-33203\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATOR EVALUATION OF SEPARATION OF DISPLAY PARAMETERS IN PATH-FOLLOWING TASKS**

G. R. SARMA and J. J. ADAMS Oct. 1981 44 p refs  
(NASA-TP-1915; L-14590) Avail: NTIS HC A03/MF A01 CSCL 01D

AIRCRAFT INSTRUMENTS, DEGREES OF FREEDOM, INSTRUMENT LANDING SYSTEMS, LATERAL CONTROL

**N82-14085\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A GENERAL AVIATION SIMULATOR EVALUATION OF A RATE-ENHANCED INSTRUMENT LANDING SYSTEM DISPLAY**

D. A. HINTON Dec. 1981 44 p  
(NASA-TP-1960; L-13911) Avail: NTIS HC A03/MF A01 CSCL 01D

COCKPIT SIMULATORS, CONTROL SIMULATION, DISPLAY DEVICES, FLIGHT SIMULATORS, INSTRUMENT LANDING SYSTEMS, TRACKING (POSITION)

**N82-20180\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATOR STUDY OF A PICTORIAL DISPLAY FOR GENERAL AVIATION INSTRUMENT FLIGHT**

J. J. ADAMS Mar. 1982 59 p refs  
(NASA-TP-1963; L-14675; NAS 1.60:1963) Avail: NTIS HC A04/MF A01 CSCL 01D

COCKPIT SIMULATORS, COMPUTER GRAPHICS, DISPLAY DEVICES, FLIGHT SIMULATION, GENERAL AVIATION AIRCRAFT, INSTRUMENT LANDING SYSTEMS

## 06 AIRCRAFT INSTRUMENTATION

**N82-33381\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**AN OPERATIONAL EVALUATION OF HEAD UP DISPLAYS FOR CIVIL TRANSPORT OPERATIONS. NASA/FAA PHASE 3 REPORT Final Report**

J. K. LAUBER, R. S. BRAY, R. L. HARRISON, J. C. HEMINGWAY, and B. C. SCOTT (FAA) Aug. 1982 198 p refs  
(NASA-TP-1815; A-8477; NAS 1.60:1815; HUD-16) Avail: NTIS HC A09/MF A01 CSCL 01D

CIVIL AVIATION, COMMERCIAL AIRCRAFT, HEAD-UP DISPLAYS, TRAINING EVALUATION

**N83-16338\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RESULTS FROM TESTS, WITH VAN-MOUNTED SENSOR, OF MAGNETIC LEADER CABLE FOR AIRCRAFT GUIDANCE DURING ROLL-OUT AND TURNOFF**

J. C. YOUNG, W. T. BUNDICK, and S. H. IRWIN Jan. 1983 38 p refs

(NASA-TP-2092; L-15482; NAS 1.60:2092) Avail: NTIS HC A03/MF A01 CSCL 01D

AIRCRAFT GUIDANCE, CABLES (ROPES), TOWING

**N83-17535\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PLANNING FUEL-CONSERVATIVE DESCENTS WITH OR WITHOUT TIME CONSTRAINTS USING A SMALL PROGRAMMABLE CALCULATOR: ALGORITHM DEVELOPMENT AND FLIGHT TEST RESULTS**

C. E. KNOX Mar. 1983 39 p refs  
(NASA-TP-2085; L-15389; NAS 1.60:2085) Avail: NTIS HC A03/MF A01 CSCL 01D

CALCULATORS, DESCENT TRAJECTORIES, TRAJECTORY MEASUREMENT

**N83-18723\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATION STUDY OF TRAFFIC-SENSOR NOISE EFFECTS ON UTILIZATION OF TRAFFIC SITUATION DISPLAY FOR SELF-SPACING TASK**

D. H. WILLIAMS and G. C. MOEN (Army Research and Technology Labs., Hampton, Va.) Feb. 1983 36 p refs  
(DA PROJ. 1L2-62209-AH-76)

(NASA-TP-2082; L-15403; NAS 1.60:2082; AVRADCOM-TR-82-B-8) Avail: NTIS HC A03/MF A01 CSCL 05H

AIRCRAFT APPROACH SPACING, AZIMUTH, INSTRUMENT APPROACH, INSTRUMENT ERRORS, PILOT PERFORMANCE, RANGE ERRORS

**N83-36028\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF LEAD-AIRCRAFT GROUND-SPEED ON SELF-SPACING PERFORMANCE USING A COCKPIT DISPLAY OF TRAFFIC INFORMATION**

J. R. KELLY Oct. 1983 50 p refs  
(NASA-TP-2194; L-15402; NAS 1.60:2194) Avail: NTIS HC A03/MF A01 CSCL 01D

AIR TRAFFIC, COCKPIT SIMULATORS, COMPUTERIZED SIMULATION, DISPLAY DEVICES, FACTORIAL DESIGN, FLIGHT CONTROL

**N84-12164\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EVALUATION OF A TOTAL ENERGY-RATE SENSOR ON A TRANSPORT AIRPLANE**

A. J. OSTROFF, R. M. HUESCHEN, R. F. HELLBAUM, C. M. BELCASTRO, and J. F. CREEDON Nov. 1983 48 p refs  
(NASA-TP-2212; NAS 1.60:2212; L-15461) Avail: NTIS HC A03/MF A01 CSCL 01D

ADAPTIVE FILTERS, AIR FLOW, ENERGY REQUIREMENTS, SENSORS, TRANSPORT AIRCRAFT, WIND SHEAR

**N84-13182\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATOR STUDY OF PILOT-AIRCRAFT-DISPLAY SYSTEM RESPONSE OBTAINED WITH A THREE-DIMENSIONAL-BOX PICTORIAL DISPLAY**

J. J. ADAMS Dec. 1983 52 p refs  
(NASA-TP-2122; L-15632; NAS 1.60:2122) Avail: NTIS HC A04/MF A01 CSCL 01D

AIRCRAFT INSTRUMENTS, DISPLAY DEVICES, SERVOMECHANISMS

**N84-21542\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATION OF A COCKPIT-DISPLAY CONCEPT FOR EXECUTING A WAKE-VORTEX AVOIDANCE PROCEDURE**

T. S. ABBOTT Apr. 1984 37 p refs  
(NASA-TP-2300; L-15736; NAS 1.60:2300) Avail: NTIS HC A03/MF A01 CSCL 01D

AIR TRAFFIC CONTROL, COCKPITS, COMPUTERIZED SIMULATION, FEASIBILITY ANALYSIS, GLIDE PATHS, VORTICES, WAKES

**N85-10044\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**PERIPHERAL VISION HORIZON DISPLAY (PVHD)**

Apr. 1984 131 p refs Conf. held at Edwards, Calif., 15-16 Mar. 1983

(NASA-CP-2306; H-1232; NAS 1.55:2306) Avail: NTIS HC A07/MF A01 CSCL 01D

ATTITUDE INDICATORS, CONFERENCES, DISPLAY DEVICES, PERIPHERAL VISION

**N85-16868\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**REFERENCE ENERGY-ALTITUDE DESCENT GUIDANCE: SIMULATOR EVALUATION**

K. H. ABBOT and C. E. KNOX Jan. 1985 39 p refs  
(NASA-TP-2383; L-15800; NAS 1.60:2383) Avail: NTIS HC A03/MF A01 CSCL 01D

DESCENT, FLIGHT CONTROL, FLIGHT SIMULATORS, FUEL CONSUMPTION

**N85-16869\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A COCKPIT-DISPLAY CONCEPT FOR EXECUTING A MULTIPLE GLIDE-SLOPE APPROACH FOR WAKE-VORTEX AVOIDANCE**

T. S. ABBOTT Feb. 1984 44 p refs  
(NASA-TP-2386; L-15852; NAS 1.60:2386) Avail: NTIS HC A03/MF A01 CSCL 01D

AIR TRAFFIC CONTROL, APPROACH, COCKPITS, DISPLAY DEVICES, GLIDE PATHS

**N85-26705\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PLANNING FUEL-CONSERVATIVE DESCENTS IN AN AIRLINE ENVIRONMENTAL USING A SMALL PROGRAMMABLE CALCULATOR: ALGORITHM DEVELOPMENT AND FLIGHT TEST RESULTS**

C. E. KNOX, D. D. VICROY, and D. A. SIMMON (United Airlines, Inc., Chicago) May 1985 77 p refs  
(NASA-TP-2393; L-15844; NAS 1.60:2393) Avail: NTIS HC A05/MF A01 CSCL 01D

COMPUTER TECHNIQUES, DESCENT, ENERGY CONSERVATION, FLIGHT MANAGEMENT SYSTEMS, FLIGHT PATHS, FLIGHT TESTS, FUEL CONSUMPTION

## AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft.

**N77-17081\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AIRCRAFT PISTON ENGINE EXHAUST EMISSION SYMPOSIUM**

Sep. 1976 373 p Symp. held in Cleveland, 14-15 Sep. 1976 (NASA-CP-2005; E-9010) Avail: NTIS HC A16/MF A01 CSDL 21E

AIR POLLUTION, CONFERENCES, EXHAUST GASES, PISTON ENGINES

**N77-31152\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AERODYNAMIC AND DIRECTIONAL ACOUSTIC PERFORMANCE OF A SCOOP INLET**

J. M. ABBOTT and D. A. DIETRICH Sep. 1977 28 p refs (NASA-TP-1028; E-9134) Avail: NTIS HC A03/MF A01 CSDL 21E

NOISE REDUCTION, SCOOPS, STRUCTURAL DESIGN CRITERIA, WIND TUNNEL TESTS

**N77-31153\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF TEMPERATURE TRANSIENTS AT FAN INLET OF A TURBOFAN ENGINE**

M. ABDELWAHAB Sep. 1977 40 p refs (NASA-TP-1031; E-9162) Avail: NTIS HC A03/MF A01 CSDL 21E

INLET FLOW, TEMPERATURE EFFECTS, TEMPERATURE GRADIENTS, TURBOFAN ENGINES

**N77-31154\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DEVELOPMENT AND VERIFICATION OF REAL-TIME, HYBRID COMPUTER SIMULATION OF F100-PW-100(3) TURBOFAN ENGINE**

J. R. SZUCH, K. SELDNER, and D. S. CWYNAR Sep. 1977 75 p refs (NASA-TP-1034; E-9090) Avail: NTIS HC A04/MF A01 CSDL 21E

COMPUTERIZED SIMULATION, HYBRID COMPUTERS, REAL TIME OPERATION, TURBOFAN ENGINES

**N77-32153\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL FLOW COEFFICIENTS OF A FULL-COVERAGE FILM-COOLED-VANE CHAMBER**

P. L. MEITNER (Army Air Mobility Research and Development Lab., Cleveland, Ohio) and S. A. HIPPENSTEELE Sep. 1977 31 p refs (NASA-TP-1036; E-9146) Avail: NTIS HC A03/MF A01 CSDL 21E

FILM COOLING, FLOW COEFFICIENTS, PERFORATED PLATES, TURBINE BLADES

**N77-32154\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF SLOTTED CASING TREATMENT WITH CHANGE IN REYNOLDS NUMBER INDEX ON PERFORMANCE OF A JET ENGINE**

J. E. MOSS, JR. and W. M. BRAITHWAITE Sep. 1977 19 p refs (NASA-TP-1058; E-9185) Avail: NTIS HC A02/MF A01 CSDL 21E

ENGINE TESTS, JET ENGINES, NACELLES, REYNOLDS NUMBER

**N77-33169\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**F100 MULTIVARIABLE CONTROL SYNTHESIS PROGRAM: EVALUATION OF A MULTIVARIABLE CONTROL USING A REAL-TIME ENGINE SIMULATION**

J. R. SZUCH, J. F. SOEDER, K. SELDNER, and D. S. CWYNAR Oct. 1977 103 p refs (NASA-TP-1056; E-9170) Avail: NTIS HC A06/MF A01 CSDL 21E

COMPUTERIZED SIMULATION, ENGINE CONTROL, TURBOFAN ENGINES

**N78-10068\*#** Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

**AN ASSESSMENT OF TECHNOLOGY FOR TURBOJET ENGINE ROTOR FAILURES**

E. A. WITMER, ed. Mar. 1977 425 p Workshop held at Cambridge, Mass., 29-31 Mar. 1977; sponsored by NASA (NASA-CP-2017; E-8305) Avail: NTIS HC A18/MF A01 CSDL 21E

AIRCRAFT HAZARDS, CONFERENCES, FAILURE ANALYSIS, ROTORS, TECHNOLOGY ASSESSMENT, TURBOJET ENGINES

**N78-11063\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AIRCRAFT ENGINE EMISSIONS**

Oct. 1977 452 p Conf. held in Cleveland, 18-19 May 1977 (NASA-CP-2021; E-9262) Avail: NTIS HC A20/MF A01 CSDL 21E

AIR POLLUTION, AIRCRAFT ENGINES, CONFERENCES, EXHAUST GASES, POLLUTION CONTROL

**N78-11106\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ALTITUDE TEST OF SEVERAL AFTERBURNER CONFIGURATIONS ON A TURBOFAN ENGINE WITH A HYDROGEN HEATER TO SIMULATE AN ELEVATED TURBINE DISCHARGE TEMPERATURE**

R. L. JOHNSON and R. R. CULLOM Nov. 1977 57 p refs (NASA-TP-1068; E-9207) Avail: NTIS HC A04/MF A01 CSDL 21E

AFTERBURNING, ALTITUDE TESTS, TURBOFAN ENGINES

**N78-13064\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INFLUENCE OF OIL-SQUEEZE-FILM DAMPING ON STEADY-STATE RESPONSE OF FLEXIBLE ROTOR OPERATING TO SUPERCRITICAL SPEEDS**

R. E. CUNNINGHAM Dec. 1977 44 p refs (NASA-TP-1094; E-9091) Avail: NTIS HC A03/MF A01 CSDL 21E

FLEXIBLE BODIES, ROTORS, SUPERCRITICAL FLOW, VISCOUS DAMPING

## 07 AIRCRAFT PROPULSION AND POWER

**N78-16053\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COLD-AIR PERFORMANCE OF FREE-POWER TURBINE DESIGNED FOR 112-KILOWATT AUTOMOTIVE GAS-TURBINE ENGINE. 1: DESIGN STATOR-VANE-CHORD SETTING ANGLE OF 35 DEG**

M. G. KOFESKEY and W. J. NUSBAUM Jan. 1978 23 p refs (NASA-TP-1007; CONS/1011-12; E-8964) Avail: NTIS HC A02/MF A01 CSCL 21E

AIR COOLING, AUTOMOBILE ENGINES, ENGINE DESIGN, GAS TURBINE ENGINES, STATOR BLADES

**N78-20130\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TWO-DIMENSIONAL COLD-AIR CASCADE STUDY OF A FILM-COOLED TURBINE STATOR BLADE. 4: COMPARISON OF EXPERIMENTAL AND ANALYTICAL AERODYNAMIC RESULTS FOR BLADE WITH 12 ROWS OF 0.076-CENTIMETER-(0.030-INCH-) DIAMETER HOLES HAVING STREAMWISE EJECTION ANGLES**

H. W. PRUST, JR. Mar. 1978 30 p refs (NASA-TP-1151; E-9187) Avail: NTIS HC A03/MF A01 CSCL 21E

AERODYNAMIC CHARACTERISTICS, CASCADE FLOW, FILM COOLING, STATOR BLADES, TURBINE BLADES

**N78-20131\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF A SHORT ANNULAR DUMP DIFFUSER USING SUCTION-STABILIZED VORTICES AT INLET MACH NUMBERS TO 0.41**

J. M. SMITH and A. J. JUHASZ Apr. 1978 40 p refs (NASA-TP-1194; E-9332) Avail: NTIS HC A03/MF A01 CSCL 21E

ANNULAR NOZZLES, GAS EXPANSION, PERFORMANCE TESTS, TURBULENT DIFFUSION, VORTICES

**N78-20132\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SIMULATED FLIGHT EFFECTS ON NOISE CHARACTERISTICS OF A FAN INLET WITH HIGH THROAT MACH NUMBER**

H. L. WESOKY, D. A. DIETRICH, and J. M. ABBOTT Apr. 1978 45 p refs (NASA-TP-1199; E-9253) Avail: NTIS HC A03/MF A01 CSCL 21E

AERODYNAMIC NOISE, FLIGHT SIMULATION, INLET FLOW, MACH NUMBER

**N78-20133\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TWO-DIMENSIONAL COLD-AIR CASCADE STUDY OF A FILM-COOLED TURBINE STATOR BLADE. 5: COMPARISON OF EXPERIMENTAL AND ANALYTICAL AERODYNAMIC RESULTS FOR BLADE WITH 12 ROWS OF 0.038-CENTIMETER-(0.015 INCH) DIAMETER COOLANT HOLES HAVING STREAMWISE EJECTION ANGLES**

H. W. PRUST, JR. Apr. 1978 23 p refs (NASA-TP-1204; E-9342) Avail: NTIS HC A02/MF A01 CSCL 21E

AERODYNAMIC CHARACTERISTICS, CASCADE FLOW, FILM COOLING, STATOR BLADES, TURBINE BLADES

**N78-21112\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AIRFLOW AND THRUST CALIBRATION OF AN F100 ENGINE, S/N P680059, AT SELECTED FLIGHT CONDITIONS**

T. J. BIESIADNY, D. LEE, and J. R. RODRIGUEZ Apr. 1978 27 p refs (NASA-TP-1069; E-9257) Avail: NTIS HC A03/MF A01 CSCL 21E

AIRFRAMES, CALIBRATING, F-100 AIRCRAFT, PROPULSION SYSTEM PERFORMANCE, THRUST MEASUREMENT

**N78-21113\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLOW VISUALIZATION OF FILM COOLING WITH SPANWISE INJECTION FROM A SMALL ARRAY OF HOLES AND COMPOUND-ANGLE INJECTION FROM A LARGE ARRAY**

L. M. RUSSELL Apr. 1978 18 p refs (NASA-TP-1195; E-9340) Avail: NTIS HC A02/MF A01 CSCL 21E

FILM COOLING, FLOW VISUALIZATION, FLUID INJECTION

**N78-21114\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THEORETICAL FLOW CHARACTERISTICS OF INLETS FOR TILTING-NACELLE VTOL AIRCRAFT**

M. A. BOLES, R. W. LUIDENS, and N. O. STOCKMAN Apr. 1978 31 p refs (NASA-TP-1205; E-9387) Avail: NTIS HC A03/MF A01 CSCL 21E

FLOW CHARACTERISTICS, INLET FLOW, NACELLES, VERTICAL TAKEOFF AIRCRAFT

**N78-22101\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**IN-PLACE RECALIBRATION TECHNIQUE APPLIED TO A CAPACITANCE-TYPE SYSTEM FOR MEASURING ROTOR BLADE TIP CLEARANCE**

J. P. BARRANGER Apr. 1978 35 p refs (NASA-TP-1110; E-9395) Avail: NTIS HC A03/MF A01 CSCL 20E

BLADE TIPS, CAPACITANCE, CLEARANCES, ROTOR BLADES (TURBOMACHINERY)

**N78-23093\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMBUSTION OF HYDROGEN IN A TWO-DIMENSIONAL DUCT WITH STEP FUEL INJECTORS**

J. M. EGGERS, P. G. REAGON, and P. B. GOODERUM May 1978 56 p refs (NASA-TP-1159; L-11981) Avail: NTIS HC A04/MF A01 CSCL 21E

FUEL INJECTION, HYDROGEN, SUPERSONIC COMBUSTION, TWO DIMENSIONAL FLOW

**N78-23094\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTERACTION BETWEEN STEP FUEL INJECTORS ON OPPOSITE WALLS IN A SUPERSONIC COMBUSTOR MODEL**

C. R. MCCLINTON May 1978 61 p refs (NASA-TP-1174; L-11811) Avail: NTIS HC A04/MF A01 CSCL 21E

FUEL INJECTION, SUPERSONIC COMBUSTION, SUPERSONIC COMBUSTION RAMJET ENGINES

**N78-23095\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ALTITUDE CALIBRATION OF AN F100, S/N P680063, TURBOFAN ENGINE**

T. J. BIESIADNY, D. LEE, and J. R. RODRIGUEZ May 1978 23 p refs (NASA-TP-1228; E-9355) Avail: NTIS HC A02/MF A01 CSCL 21E

ALTITUDE TESTS, ENGINE TESTS, F-100 AIRCRAFT, THRUST MEASUREMENT, TURBOFAN AIRCRAFT

**N78-26148\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EMITTANCE AND ABSORPTANCE OF NASA CERAMIC THERMAL BARRIER COATING SYSTEM**

C. H. LIEBERT Jun. 1978 31 p refs Presented in part at the Intern. Conf. on Met. Coatings, San Francisco, 3-7 Apr. 1978; sponsored by the Am. Vacuum Soc. (NASA-TP-1190; E-9474) Avail: NTIS HC A03/MF A01 CSCL 20E

ABSORPTION SPECTRA, CERAMIC COATINGS, METAL COMPOUNDS, SPECTRAL EMISSION, THERMAL PROTECTION

**N78-27130\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**REVERSE-FLOW COMBUSTOR FOR SMALL GAS TURBINES WITH PRESSURE-ATOMIZING FUEL INJECTORS**

C. T. NORGREN, E. J. MULARZ (AVRADCOM Res. and Technol. Labs.), and S. M. RIDDLEBAUGH Aug. 1978 30 p refs (NASA-TP-1260; AVRADCOM-TR-78-22(PL); E-9458) Avail: NTIS HC A03/MF A01 CSCL 21E

COMBUSTION CHAMBERS, FUEL INJECTION, GAS TURBINE ENGINES, PRESSURE DISTRIBUTION, REVERSED FLOW

**N78-28099\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FORTRAN PROGRAM FOR CALCULATING COOLANT FLOW AND METAL TEMPERATURES OF A FULL-COVERAGE-FILM-COOLED VANE OR BLADE**

P. L. MEITNER (AVRADCOM R and T Labs., Cleveland) Jul. 1978 92 p refs (NASA-TP-1259; E-9491; AVRADCOM-TR-78-19(PL)) Avail: NTIS HC A05/MF A01 CSCL 21E

COMPUTER PROGRAMS, FILM COOLING, HEAT TRANSFER, TURBINE BLADES

**N78-31109\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYSIS OF METAL TEMPERATURE AND COOLANT FLOW WITH A THERMAL-BARRIER COATING ON A FULL-COVERAGE-FILM-COOLED TURBINE VANE**

P. L. MEITNER (AVRADCOM Res. and Technol. Labs.) Aug. 1978 15 p refs (NASA-TP-1310; AVRADCOM-TR-78-20) Avail: NTIS HC A02/MF A01 CSCL 21E

FILM COOLING, HEAT TRANSFER, THERMAL CONTROL COATINGS, TURBINE BLADES

**N78-33107\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF A TRANSONIC FAN STAGE DESIGNED FOR A LOW MERIDIONAL VELOCITY RATIO**

R. D. MOORE, G. W. LEWIS, JR., and W. M. OSBORN Nov. 1978 83 p refs (NASA-TP-1298; E-8994) Avail: NTIS HC A05/MF A01 CSCL 21E

COMPRESSOR ROTORS, SUPERSONIC TURBINES, TURBOFANS

**N78-33108\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DESIGN AND OVERALL PERFORMANCE OF FOUR HIGHLY LOADED, HIGH SPEED INLET STAGES FOR AN ADVANCED HIGH-PRESSURE-RATIO CORE COMPRESSOR**

L. REID and R. D. MOORE Oct. 1978 122 p refs (NASA-TP-1337; E-9302) Avail: NTIS HC A06/MF A01 CSCL 21E

COMPRESSOR EFFICIENCY, COMPRESSOR ROTORS, ENGINE DESIGN, INTAKE SYSTEMS, PRESSURE DISTRIBUTION

**N78-33109\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DESIGN AND PERFORMANCE OF A 427-METER-PER-SECOND-TIP-SPEED TWO-STAGE FAN HAVING A 2.40 PRESSURE RATIO**

W. S. CUNNAN, W. STEVANS, and D. C. URASEK Oct. 1978 96 p refs (NASA-TP-1314; E-9005) Avail: NTIS HC A05/MF A01 CSCL 21E

AXIAL FLOW TURBINES, COMPRESSOR ROTORS, TIP SPEED, TURBOMACHINERY

**N78-33110\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DYGABCD: A PROGRAM FOR CALCULATING LINEAR A, B, C, AND D MATRICES FROM A NONLINEAR DYNAMIC ENGINE SIMULATION**

L. C. GEYSER Sep. 1978 203 p refs (NASA-TP-1295; E-9464) Avail: NTIS HC A10/MF A01 CSCL 21E

COMPUTER PROGRAMS, COMPUTERIZED SIMULATION, MATRICES (MATHEMATICS), TURBOFAN ENGINES, TURBOJET ENGINES

**N79-10060\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.19 AND 1.26, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 1.82**

L. REID and R. D. MOORE Nov. 1978 103 p refs (NASA-TP-1338; E-9461) Avail: NTIS HC A06/MF A01 CSCL 21E

TRANSONIC FLOW, TURBOCOMPRESSORS

**N79-13044\*#** National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.

**COMPARISON OF CALCULATED AND ALTITUDE-FACILITY-MEASURED THRUST AND AIRFLOW OF TWO PROTOTYPE F100 TURBOFAN ENGINES**

F. J. KURTENBACH Dec. 1978 29 p refs (NASA-TP-1373; H-1015) Avail: NTIS HC A03/MF A01 CSCL 21E

AIR FLOW, JET THRUST, THRUST MEASUREMENT, TURBOFAN ENGINES

**N79-13045\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**MEASUREMENTS AND PREDICTIONS OF FLYOVER AND STATIC NOISE OF A TF30 AFTERBURNING TURBOFAN ENGINE**

F. W. BURCHAM, JR., P. L. LASAGNA, and S. C. OAS (Boeing Com. Airplane Co.) Dec. 1978 94 p refs (NASA-TP-1372; H-1017) Avail: NTIS HC A05/MF A01 CSCL 21E

AFTERBURNING, ENGINE NOISE, F-111 AIRCRAFT, NOISE MEASUREMENT, TURBOFAN ENGINES

**N79-13046\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LOW-CYCLE FATIGUE OF THERMAL-BARRIER COATINGS AT 982 DEG C**

A. KAUFMAN, C. H. LIEBERT, and A. J. NACHTIGALL Dec. 1978 20 p refs (NASA-TP-1322; E-9688) Avail: NTIS HC A02/MF A01 CSCL 21E

CERAMIC COATINGS, FATIGUE LIFE, THERMAL RESISTANCE

## 07 AIRCRAFT PROPULSION AND POWER

**N79-14098\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CERAMIC COATING EFFECT ON LINER METAL TEMPERATURES OF FILM-COOLED ANNULAR COMBUSTOR**  
R. W. CLAUS, J. D. WEAR, and C. H. LIEBERT Jan. 1979 24 p refs  
(NASA-TP-1323; E-9732) Avail: NTIS HC A03/MF A01 CSCL 21E

CERAMICS, COMBUSTION CHAMBERS, FILM COOLING, PROTECTIVE COATINGS, TEMPERATURE DISTRIBUTION

**N79-14099\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF SWIRLER-MOUNTED MIXING VENTURI ON EMISSIONS OF FLAME-TUBE COMBUSTOR USING JET A FUEL**

D. B. ERCEGOVIC Jan. 1979 23 p refs  
(NASA-TP-1393; AVRADCOM-TR-78-41; E-9762) Avail: NTIS HC A02/MF A01 CSCL 21E

EXHAUST GASES, FUEL COMBUSTION, FUEL INJECTION, VENTURI TUBES

**N79-15961\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THE ROTARY COMBUSTION ENGINE: A CANDIDATE FOR GENERAL AVIATION**

1978 190 p refs Symp. held at Cleveland, Ohio, 28 Feb. 1978  
(NASA-CP-2067; E-9800) Avail: NTIS HC A09/MF A01 CSCL 21A

AIRCRAFT ENGINES, CONFERENCES, ENGINE DESIGN, GENERAL AVIATION AIRCRAFT, MECHANICAL DRIVES

**N79-16852\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF CASING TREATMENT ON PERFORMANCE OF A TWO-STAGE HIGH-PRESSURE-RATIO FAN**

D. C. URASEK Feb. 1979 68 p refs  
(NASA-TP-1409; E-8997) Avail: NTIS HC A04/MF A01 CSCL 21E

COMPRESSOR ROTORS, ROTOR AERODYNAMICS, ROTOR BLADES (TURBOMACHINERY), STATOR BLADES

**N79-22099\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF A VORTEX-CONTROLLED DIFFUSER IN AN ANNULAR SWIRL-CAN COMBUSTOR AT INLET MACH NUMBERS UP TO 0.53**

J. M. SMITH Washington Apr. 1979 17 p refs  
(NASA-TP-1452; E-9832) Avail: NTIS HC A02/MF A01 CSCL 21E

ANNULAR NOZZLES, COMBUSTION CHAMBERS, DIFFUSERS, FLOW STABILITY, SUCTION, VORTICES

**N79-23086\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF PRIMARY-ZONE EQUIVALENCE RATIO ON POLLUTANT FORMATION**

R. W. CLAUS May 1979 20 p refs  
(NASA-TP-1463; E-9896) Avail: NTIS HC A02/MF A01 CSCL 21E

AIR POLLUTION, COMBUSTION CHAMBERS, COMBUSTION PRODUCTS, EXHAUST GASES, SMOKE

**N79-23967\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF TWO-STAGE FAN WITH LARGER DAMPERS ON FIRST-STAGE ROTOR**

D. C. URASEK, W. S. CUNNAN, and W. STEVANS May 1979 81 p refs  
(NASA-TP-1399; E-8958) Avail: NTIS HC A05/MF A01 CSCL 21E

DAMPERS, FANS, HIGH PRESSURE, TURBOMACHINERY

**N79-24994\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PREMIXED PREVAPORIZED COMBUSTOR TECHNOLOGY FORUM**

1979 262 p refs Conf. held at Cleveland, Ohio, 9-10 Jan. 1979  
(NASA-CP-2078; E-9933) Avail: NTIS HC A12/MF A01 CSCL 21E

AIRCRAFT ENGINES, COMBUSTION CHAMBERS, CONFERENCES, FUEL COMBUSTION, GAS TURBINE ENGINES, PREMIXED FLAMES, TECHNOLOGY ASSESSMENT, VAPORIZING

**N79-25016\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FUNDAMENTALS OF GAS TURBINE COMBUSTION**

M. GERSTEIN (Univ. of Southern Calif., Los Angeles) 1979 52 p Workshop held at Cleveland, 6-7 Feb. 1979  
(NASA-CP-2087; E-026) Avail: NTIS HC A04/MF A01 CSCL 21E

AIRCRAFT PARTS, COMBUSTION CHAMBERS, GAS TURBINES

**N79-25022\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**OPERATING CONDITION AND GEOMETRY EFFECTS ON LOW-FREQUENCY AFTERBURNER COMBUSTION INSTABILITY IN A TURBOFAN AT ALTITUDE**

R. R. CULLOM and R. L. JOHNSEN Jun. 1979 31 p refs  
(NASA-TP-1475; E-9886) Avail: NTIS HC A03/MF A01 CSCL 21E

AFTERBURNING, COMBUSTION STABILITY, TURBOFAN ENGINES

**N79-25023\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INDUSTRY TESTS OF NASA CERAMIC THERMAL BARRIER COATING**

C. H. LIEBERT and F. S. STEPKA Jun. 1979 26 p refs Presented at 6th Intern. Vacuum Metallurgy Conf., San Diego, Calif., 23-27 Apr. 1979; Sponsored by Am. Vacuum Soc.  
(NASA-TP-1425; E-9846) Avail: NTIS HC A03/MF A01 CSCL 21E

CERAMICS, GAS TURBINE ENGINES, THERMAL CONTROL COATINGS

**N79-26057\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**EVALUATION OF A SIMPLIFIED GROSS THRUST CALCULATION TECHNIQUE USING TWO PROTOTYPE F100 TURBOFAN ENGINES IN AN ALTITUDE FACILITY**

F. J. KURTENBACH Jun. 1979 30 p refs  
(NASA-TP-1482; H-1061) Avail: NTIS HC A03/MF A01 CSCL 21E

ENGINE TESTS, TEST FACILITIES, THRUST MEASUREMENT, TURBOFAN ENGINES

**N79-27142\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FLOW VISUALIZATION OF DISCRETE-HOLE FILM COOLING WITH SPANWISE INJECTION OVER A CYLINDER**

L. M. RUSSELL Jul. 1979 15 p refs  
(NASA-TP-1491; E-9946) Avail: NTIS HC A02/MF A01 CSCL 21E

FILM COOLING, FLOW VISUALIZATION, TURBINE BLADES



**N79-27143\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF TWO-STAGE FAN HAVING LOW-ASPECT-RATIO FIRST-STAGE ROTOR BLADING**

D. C. URASEK, W. T. GORRELL (Army Aviation Res. and Develop. Command, Cleveland), and W. S. CUNNAN Aug. 1979 132 p Prepared in cooperation with US Army Aviation Research and Development Command, Cleveland (NASA-TP-1493; AVRADCOM-TR-78-49; E-9237) Avail: NTIS HC A07/MF A01 CSCL 21E  
FANS, LOW ASPECT RATIO, ROTOR BLADES (TURBOMACHINERY)

**N79-28176\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**A THROAT-BYPASS STABILITY-BLEED SYSTEM USING RELIEF VALVES TO INCREASE THE TRANSIENT STABILITY OF A MIXED-COMPRESSION INLET**

G. H. NEINER, M. O. DUSTIN, and G. L. COLE Jul. 1979 47 p refs (NASA-TP-1083; E-8950) Avail: NTIS HC A03/MF A01 CSCL 21E  
AIR INTAKES, BYPASSES, FLOW STABILITY, SUPERSONIC INLETS, WIND TUNNEL TESTS, YF-12 AIRCRAFT

**N79-28177\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF ROTOR MERIDIONAL VELOCITY RATIO ON RESPONSE TO INLET RADIAL AND CIRCUMFERENTIAL DISTORTION**

N. L. SANGER Jul. 1979 73 p refs (NASA-TP-1278; E-8987) Avail: NTIS HC A04/MF A01 CSCL 21E  
COMPRESSOR ROTORS, FLOW DISTORTION, INLET FLOW, MERIDIONAL FLOW, ROTOR AERODYNAMICS, VELOCITY DISTRIBUTION

**N79-29192\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CRITERIA FOR SELF-IGNITION OF SUPERSONIC HYDROGEN-AIR MIXTURES**

P. W. HUBER, C. J. SCHEXNAYDER, JR., and C. R. MCCLINTON Aug. 1979 58 p refs (NASA-TP-1457; L-12678) Avail: NTIS HC A04/MF A01 CSCL 21A  
GAS MIXTURES, HYDROGEN, IGNITION LIMITS, SUPERSONIC COMBUSTION RAMJET ENGINES

**N79-30191\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF TWO-STAGE FAN WITH A FIRST-STAGE ROTOR REDESIGNED TO ACCOUNT FOR THE PRESENCE OF A PART-SPAN DAMPER**

W. T. GORRELL and D. C. YRASEK Sep. 1979 72 p refs (NASA-TP-1483; E-9786; AVRADCOM-TR-79-10) Avail: NTIS HC A04/MF A01 CSCL 21E  
AERODYNAMIC CONFIGURATIONS, COMPRESSOR ROTORS, ROTOR AERODYNAMICS, ROTOR BLADES (TURBOMACHINERY), VIBRATION ISOLATORS

**N79-31213\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AERODYNAMIC PERFORMANCE OF 1.38-PRESSURE-RATIO, VARIABLE-PITCH FAN STAGE**

R. D. MOORE and W. M. OSBORN Sep. 1979 71 p (NASA-TP-1502; E-9700) Avail: NTIS HC A04/MF A01 CSCL 21E  
AXIAL FLOW TURBINES, COMPRESSOR BLADES, LIFT FANS, PRESSURE MEASUREMENT, ROTOR BLADES (TURBOMACHINERY), TURBOCOMPRESSORS, VARIABLE PITCH PROPELLERS

**N79-31214\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AERODYNAMIC PERFORMANCE OF AXIAL-FLOW FAN STAGE OPERATED AT NINE INLET GUIDE VANE ANGLES**

R. D. MOORE and L. REID Sep. 1979 43 p refs (NASA-TP-1510; E-9714) Avail: NTIS HC A03/MF A01 CSCL 21E  
AIR FLOW, AXIAL FLOW TURBINES, ENGINE TESTS, GUIDE VANES, LIFT FANS, PERFORMANCE TESTS, VERTICAL TAKEOFF AIRCRAFT

**N79-33210\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF DIFFUSION FACTOR, ASPECT RATIO AND SOLIDITY ON OVERALL PERFORMANCE OF 14 COMPRESSOR MIDDLE STAGES**

W. R. BRITSCH, W. M. OSBORN, and M. R. LAESSIG Washington Sep. 1979 148 p (NASA-TP-1523; E-9943) Avail: NTIS HC A07/MF A01 CSCL 21E  
ASPECT RATIO, COMPRESSOR BLADES, COMPRESSOR ROTORS, DIFFUSION, PERFORMANCE TESTS, TURBOCOMPRESSORS

**N80-10205\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AEROPROPULSION 1979**

1979 464 p Proceedings of conf. held at Cleveland, 15-16 May 1979 (NASA-CP-2092; E-079) Avail: NTIS HC A20/MF A01 CSCL 21E  
AIRCRAFT ENGINES, CONFERENCES, ENGINE DESIGN, PROPULSION SYSTEM PERFORMANCE, TURBINE ENGINES

**N80-11087\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INFLUENCE OF COOLANT TUBE CURVATURE ON FILM COOLING EFFECTIVENESS AS DETECTED BY INFRARED IMAGERY**

S. S. PAPELL, R. W. GRAHAM, and R. P. CAGEAO Washington Nov. 1979 18 p refs (NASA-TP-1546; E-066) Avail: NTIS HC A02/MF A01 CSCL 21E  
COOLANTS, COOLING, FILM COOLING, HILSCH TUBES, INFRARED IMAGERY

**N80-14121\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**STATIC TEST-STAND PERFORMANCE OF THE YF-102 TURBOFAN ENGINE WITH SEVERAL EXHAUST CONFIGURATIONS FOR THE QUIET SHORT-HAUL RESEARCH AIRCRAFT (QSRA)**

J. G. MCARDLE, L. HOMYAK, and A. S. MOORE Nov. 1979 62 p (NASA-TP-1556; E-019) Avail: NTIS HC A04/MF A01 CSCL 21E  
EXHAUST SYSTEMS, NOZZLE GEOMETRY, QUIET ENGINE PROGRAM, SHORT HAUL AIRCRAFT, STATIC FIRING, TURBOFAN ENGINES

**N80-14123\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DYNAMIC RESPONSE OF A MACH 2.5 AXISYMMETRIC INLET AND TURBOJET ENGINE WITH A POPPET-VALUE CONTROLLED INLET STABILITY BYPASS SYSTEM WHEN SUBJECTED TO INTERNAL AND EXTERNAL AIRFLOW TRANSIENTS**

B. W. SANDERS Washington Jan. 1980 102 p refs (NASA-TP-1531; E-9467) Avail: NTIS HC A06/MF A01 CSCL 21E  
AERODYNAMIC STABILITY, BYPASSES, PROPULSION SYSTEM PERFORMANCE, SUPERSONIC INLETS, TURBOJET ENGINES

## 07 AIRCRAFT PROPULSION AND POWER

**N80-14124\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**TURBOJET-EXHAUST-NOZZLE SECONDARY-AIRFLOW PUMPING AS AN EXIT CONTROL OF AN INLET-STABILITY BYPASS SYSTEM FOR A MACH 2.5 AXISYMMETRIC MIXED-COMPRESSION INLET**

B. W. SANDERS Jan. 1980 82 p refs  
 (NASA-TP-1532; E-9468) Avail: NTIS HC A05/MF A01 CSDL 21E

AIR FLOW, EXHAUST NOZZLES, SHOCK WAVE CONTROL, SUPERSONIC INLETS, TURBOJET ENGINES, WIND TUNNEL TESTS

**N80-14125\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EFFECT OF DEGREE OF FUEL VAPORIZATION UPON EMISSIONS FOR A PREMIXED PARTIALLY VAPORIZED COMBUSTION SYSTEM**

L. P. COOPER Jan. 1980 25 p refs  
 (NASA-TP-1582; E-010) Avail: NTIS HC A02/MF A01 CSDL 21E

COMBUSTION CHAMBERS, EXHAUST GASES, FUEL-AIR RATIO, GAS MIXTURES, GAS TURBINE ENGINES, VAPORIZING

**N80-15127\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**QUIET POWERED-LIFT PROPULSION**  
 1979 426 p refs Conf. held at Cleveland, Ohio, 14-15 Nov. 1978  
 (NASA-CP-2077; E-9906) Avail: NTIS HC A19/MF A01 CSDL 21E

C-15 AIRCRAFT, CONFERENCES, NASA PROGRAMS, POWERED LIFT AIRCRAFT, QUIET ENGINE PROGRAM, TILT ROTOR AIRCRAFT, YC-14 AIRCRAFT

**N80-15128\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DIRECT INTEGRATION OF TRANSIENT ROTOR DYNAMICS**  
 A. F. KASCAK Washington Jan. 1980 23 p refs  
 (NASA-TP-1597; AVRADCOM-TR-79-42; E-101) Avail: NTIS HC A02/MF A01 CSDL 21E  
 NUMERICAL INTEGRATION, ROTATING SHAFTS, ROTORS

**N80-15129\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**EVALUATION OF APPROXIMATE METHODS FOR THE PREDICTION OF NOISE SHIELDING BY AIRFRAME COMPONENTS**  
 W. F. AHTEY and G. MCCULLEY (Informatics, Inc., Palo Alto, Calif.) Washington Jan. 1980 105 p refs  
 (NASA-TP-1004; A-6961) Avail: NTIS HC A06/MF A01 CSDL 21E

ACOUSTIC ATTENUATION, AIRCRAFT STRUCTURES, ANECHOIC CHAMBERS, APPROXIMATION, NOISE REDUCTION, SHORT TAKEOFF AIRCRAFT

**N80-17071\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AERODYNAMIC PERFORMANCES OF THREE FAN STATOR DESIGNS OPERATING WITH ROTOR HAVING TIP SPEED OF 337 METERS PER SECOND AND PRESSURE RATIO OF 1.54. 1: EXPERIMENTAL PERFORMANCE**

T. F. GELDER Feb. 1980 108 p refs  
 (NASA-TP-1610; E-136) Avail: NTIS HC A06/MF A01 CSDL 21E

ROTOR AERODYNAMICS, STATOR BLADES, TURBO-MACHINERY

**N80-21323\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL EVALUATION OF A SPINNING-MODE ACOUSTIC-TREATMENT DESIGN CONCEPT FOR AIRCRAFT INLETS**

L. J. HEIDELBERG, E. J. RICE, and L. HOMYAK Apr. 1980 29 p refs  
 (NASA-TP-1613; E-185) Avail: NTIS HC A03/MF A01 CSDL 21E

ACOUSTIC ATTENUATION, ENGINE INLETS, F-102 AIRCRAFT, JET AIRCRAFT NOISE, NOISE REDUCTION, TURBOFAN ENGINES

**N80-21324\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AERODYNAMIC PERFORMANCES OF THREE FAN STATOR DESIGNS OPERATING WITH ROTOR HAVING TIP SPEED OF 337 METERS PER SECOND AND PRESSURE RATIO OF 1.54. RELATION OF ANALYTICAL CODE CALCULATIONS TO EXPERIMENTAL PERFORMANCE**

T. F. GELDER, J. F. SCHMIDT, and G. M. ESGAR Apr. 1980 53 p refs  
 (NASA-TP-1614; E-137) Avail: NTIS HC A04/MF A01 CSDL 21E

AERODYNAMIC CHARACTERISTICS, COMPUTER PROGRAMS, FLOW DISTRIBUTION, NUMERICAL FLOW VISUALIZATION, ROTOR AERODYNAMICS, STATOR BLADES

**N80-21325\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.19 AND 1.26 RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 2.05**

R. D. MOORE and L. REID Washington Apr. 1980 103 p  
 (NASA-TP-1659; E-138) Avail: NTIS HC A06/MF A01 CSDL 21E

LOW ASPECT RATIO, ROTOR AERODYNAMICS, STATOR BLADES, TRANSONIC COMPRESSORS, TURBOCOMPRESSORS

**N80-21326\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYSIS OF UNCERTAINTIES IN TURBINE METAL TEMPERATURE PREDICTIONS**

F. S. STEPKA Washington Apr. 1980 19 p refs  
 (NASA-TP-1593; E-228) Avail: NTIS HC A02/MF A01 CSDL 21E

PREDICTION ANALYSIS TECHNIQUES, SURFACE TEMPERATURE, TURBINE BLADES, TURBOFAN ENGINES

**N80-22327\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**GENERAL AVIATION PROPULSION**  
 Mar. 1980 437 p refs Conf. held in Cleveland, 28-29 Nov. 1979  
 (NASA-CP-2126; E-310) Avail: NTIS HC A19/MF A01 CSDL 21E

AIRCRAFT ENGINES, AIRCRAFT NOISE, CONFERENCES, ENGINE DESIGN, GENERAL AVIATION AIRCRAFT, PROPULSION SYSTEM CONFIGURATIONS

**N80-25337\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DESIGN AND COLD-AIR TEST OF SINGLE-STAGE UNCOOLED TURBINE WITH HIGH WORK OUTPUT**

T. P. MOFFITT, E. M. SZANCA, W. J. WHITNEY, and F. P. BEHNING Jun. 1980 18 p refs  
 (NASA-TP-1680; E-316) Avail: NTIS HC A02/MF A01 CSDL 21E

COLD FLOW TESTS, ENGINE DESIGN, MASS FLOW, TURBINES

## 07 AIRCRAFT PROPULSION AND POWER

**N80-25338\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COLD-AIR INVESTIGATION OF A 4 1/2 STAGE TURBINE WITH STAGE-LOADING FACTOR OF 4.66 AND HIGH SPECIFIC WORK OUTPUT. 2: STAGE GROUP PERFORMANCE**

W. J. WHITNEY, F. P. BEHNING, T. P. MOFFITT, and G. M. HOTZ Jun. 1980 16 p refs  
(NASA-TP-1688; E-315) Avail: NTIS HC A02/MF A01 CSCL 21E

AIRCRAFT ENGINES, COLD FLOW TESTS, ENGINE DESIGN, LOADS (FORCES), TURBINES

**N80-25339\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**STATIC AND TRANSIENT PERFORMANCE OF YF-102 ENGINE WITH UP TO 14 PERCENT CORE AIRBLEED FOR THE QUIET SHORT-HAUL RESEARCH AIRCRAFT**

J. G. MCARDLE, L. HOMYAK, and A. S. MOORE Jun. 1980 26 p refs

(NASA-TP-1692) Avail: NTIS HC A02/MF A01 CSCL 21E

BOUNDARY LAYER CONTROL, ENGINE TESTS, SHORT HAUL AIRCRAFT, STATIC TESTS, TRANSIENT RESPONSE, TURBOFAN ENGINES

**N80-28352\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**OFF-DESIGN CORRELATION FOR LOSSES DUE TO PART-SPAN DAMPERS ON TRANSONIC ROTORS**

W. B. ROBERTS, J. E. CROUSE, and D. M. SANDERCOCK Jul. 1980 24 p refs

(NASA-TP-1693; E-309) Avail: NTIS HC A02/MF A01 CSCL 21E

COMPRESSOR EFFICIENCY, DAMPERS (VALVES), OSCILLATION DAMPERS, PREDICTION ANALYSIS TECHNIQUES, ROTOR BLADES (TURBOMACHINERY), TURBOFAN ENGINES

**N80-29300\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AIRCRAFT RESEARCH AND TECHNOLOGY FOR FUTURE FUELS**

Jul. 1980 229 p refs Symp. held in Cleveland, Ohio, 16-17 Apr. 1980

(NASA-CP-2146; E-398) Avail: NTIS HC A11/MF A01 CSCL 21E

AIRCRAFT FUELS, CONFERENCES, FUEL COMBUSTION, FUEL PRODUCTION, JET ENGINE FUELS

**N80-32396\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LOW-PRESSURE PERFORMANCE OF ANNULAR, HIGH-PRESSURE (40 ATM) HIGH-TEMPERATURE (2480 K) COMBUSTION SYSTEM**

J. D. WEAR Washington Sep. 1980 20 p refs

(NASA-TP-1713; E-372) Avail: NTIS HC A02/MF A01 CSCL 21E

COMBUSTION CHAMBERS, EXHAUST GASES, FUEL INJECTION, FUEL-AIR RATIO, GAS PRESSURE, INLET TEMPERATURE, ISOTHERMAL PROCESSES

**N80-33409\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CONCEPTUAL MODEL OF TURBULENT FLAMEHOLDING FOR SCRAMJET COMBUSTORS**

P. W. HUBER Oct. 1980 36 p refs

(NASA-TP-1543; L-13600) Avail: NTIS HC A03/MF A01 CSCL 21E

COMBUSTION PHYSICS, ENGINE DESIGN, FLAME HOLDERS, FLAME PROPAGATION, FLAMEOUT, SUPERSONIC COMBUSTION RAMJET ENGINES

**N80-33410\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL PERFORMANCE AND ANALYSIS OF 15.04-CENTIMETER-TIP-DIAMETER, RADIAL-INFLOW TURBINE WITH WORK FACTOR OF 1.126 AND THICK BLADING**

K. L. MCLALLIN and J. E. HAAS Oct. 1980 21 p refs

Prepared in cooperation with Army Aviation Research and Development Command, St. Louis, Mo.

(NASA-TP-1730; E-391; AVRADCOM-TR-80-09) Avail: NTIS HC A02/MF A01 CSCL 21E

AERODYNAMICS, DESIGN ANALYSIS, PERFORMANCE PREDICTION, TURBINE BLADES

**N81-11037\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LOW-SPEED AERODYNAMIC PERFORMANCE OF 50.8-CENTIMETER-DIAMETER NOISE-SUPPRESSING INLETS FOR THE QUIET, CLEAN, SHORT-HAUL EXPERIMENTAL ENGINE (QCSEE)**

J. M. ABBOTT, J. H. DIEDRICH, and R. C. WILLIAMS Aug. 1978 37 p refs

(NASA-TP-1178; E-9542) Avail: NTIS HC A03/MF A01 CSCL 21E

AERODYNAMIC CHARACTERISTICS, ENGINE INLETS, NOISE REDUCTION, QUIET ENGINE PROGRAM, SHORT HAUL AIRCRAFT, WIND TUNNEL TESTS

**N81-11038\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio. Propulsion Lab.

**OFF-DESIGN PERFORMANCE LOSS MODEL FOR RADIAL TURBINES WITH PIVOTING, VARIABLE-AREA STATORS**

P. L. MEITNER and A. J. GLASSMAN Nov. 1980 15 p refs

(NASA-TP-1708; AVRADCOM-TR-80-C-13; E-455) Avail: NTIS HC A02/MF A01 CSCL 21E

STATOR BLADES, TURBINE ENGINES, VARIABLE GEOMETRY STRUCTURES

**N81-11039\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SURFACE PYROMETRY IN PRESENCE OF RADIATION FROM OTHER SOURCES WITH APPLICATION TO TURBINE BLADE TEMPERATURE MEASUREMENT**

D. R. BUCHELE Nov. 1980 19 p refs

(NASA-TP-1754; E-396) Avail: NTIS HC A02/MF A01 CSCL 21E

RADIATION PYROMETERS, THERMOCOUPLE PYROMETERS, TURBINE BLADES, WAVELENGTHS

**N81-12089\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF HOLE GEOMETRY AND ELECTRIC-DISCHARGE MACHINING (EDM) ON AIRFLOW RATES THROUGH SMALL DIAMETER HOLES IN TURBINE BLADE MATERIAL**

S. A. HIPPENSTEELE and R. P. COCHRAN Nov. 1980 14 p

(NASA-TP-1716; E-417) Avail: NTIS HC A02/MF A01 CSCL 21E

ELECTRIC DISCHARGES, FLOW VELOCITY, GAS TURBINE ENGINES, HOLE DISTRIBUTION (ELECTRONICS), MACHINING

**N81-12090\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PROPULSION CONTROLS, 1979**

Oct. 1980 147 p refs Proc. of symp. held in Cleveland, 17-19 May 1979

(NASA-CP-2137; E-477) Avail: NTIS HC A07/MF A01 CSCL 21E

ADAPTIVE CONTROL, AIR BREATHING ENGINES, AIRCRAFT ENGINES, CONFERENCES, CONTROL THEORY, ENGINE CONTROL, PROPULSION SYSTEM PERFORMANCE

## 07 AIRCRAFT PROPULSION AND POWER

**N81-13058\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EVALUATION OF A BULK CALORIMETER AND HEAT BALANCE FOR DETERMINATION OF SUPERSONIC COMBUSTOR EFFICIENCY**

C. R. MCCLINTON and G. Y. ANDERSON Dec. 1980 45 p refs

(NASA-TP-1739; L-13943) Avail: NTIS HC A03/MF A01 CSDL 21E

CALORIMETERS, COMBUSTION EFFICIENCY, HEAT BALANCE, SUPERSONIC COMBUSTION RAMJET ENGINES

**N81-15000\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### **FLIGHT EVALUATION OF A SIMPLIFIED GROSS THRUST CALCULATION TECHNIQUE USING AN F100 TURBOFAN ENGINE IN AN F-15 AIRPLANE**

F. J. KURTENBACH and F. W. BURCHAM, JR. Jan. 1981 21 p refs

(NASA-TP-1782; H-1118) Avail: NTIS HC A02/MF A01 CSDL 21E

F-15 AIRCRAFT, IN-FLIGHT MONITORING, JET THRUST, TURBOFAN ENGINES

**N81-16050\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **COLD-AIR INVESTIGATION OF FIRST STAGE OF 4-1/2-STAGE, FAN DRIVE TURBINE WITH AVERAGE STAGE-LOADING FACTOR OF 4.66**

W. J. WHITNEY, T. P. MOFFITT, and F. P. BEHNING Jan. 1981 15 p refs

(NASA-TP-1780; E-461) Avail: NTIS HC A02/MF A01 CSDL 21E

CRITICAL VELOCITY, DESIGN ANALYSIS, FAN BLADES, LOADS (FORCES)

**N81-19121\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SPECTRAL FLAME RADIANCE FROM A TUBULAR-CAN COMBUSTOR**

R. W. CLAUS Feb. 1981 15 p refs

(NASA-TP-1722; E-509) Avail: NTIS HC A02/MF A01 CSDL 21E

COMBUSTION CHAMBERS, FUEL-AIR RATIO, HYDROCARBON FUELS, RADIANCE, SPECTRAL EMISSION

**N81-20076\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **REASONS FOR LOW AERODYNAMIC PERFORMANCE OF 13.5-CENTIMETER-TIP-DIAMETER AIRCRAFT ENGINE STARTER TURBINE**

J. E. HAAS, R. J. ROELKE, and P. HERMANN (Sundstrand Corp., Rockford, Ill.) Mar. 1981 18 p Presented at the SAE Aerospace Meeting, Los Angeles, 13-16 Oct. 1980

(NASA-TP-1810; E-540; AVRADCOM-TR-80-C-17) Avail: NTIS HC A02/MF A01 CSDL 21E

AERODYNAMIC CHARACTERISTICS, AIRCRAFT ENGINES, ENGINE STARTERS, TURBINE ENGINES

**N81-21077\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **PERFORMANCE OF SEMI-TRANSPORTATION-COOLED LINER IN HIGH-TEMPERATURE-RISE COMBUSTORS**

J. D. WEAR, A. M. TROUT, and J. M. SMITH Mar. 1981 20 p refs

(NASA-TP-1806; E-494) Avail: NTIS HC A02/MF A01 CSDL 21E

COMBUSTION CHAMBERS, COMBUSTION EFFICIENCY, FUEL-AIR RATIO, LININGS

**N81-24063\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **FUNDAMENTAL HEAT TRANSFER RESEARCH FOR GAS TURBINE ENGINES**

D. E. METZGER, ed. (Arizona State Univ.) 1980 68 p refs Presented at a Workshop Held at Cleveland, 8-9 Oct. 1980

(NASA-CP-2178; E-666) Avail: NTIS HC A04/MF A01 CSDL 21E

COMPUTATIONAL FLUID DYNAMICS, CONFERENCES, FLUID FLOW, GAS TURBINE ENGINES, HEAT TRANSFER, RESEARCH AND DEVELOPMENT

**N81-24065\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **ANALYSIS OF EFFECT OF FLAMEHOLDER CHARACTERISTICS ON LEAN, PREMIXED, PARTIALLY VAPORIZED FUEL-AIR MIXTURES QUALITY AND NITROGEN OXIDES EMISSIONS**

L. P. COOPER May 1981 18 p refs

(NASA-TP-1842; E-563) Avail: NTIS HC A02/MF A01 CSDL 21E

COMBUSTION CHAMBERS, COMBUSTION EFFICIENCY, EXHAUST EMISSION, FUEL-AIR RATIO, NITROGEN OXIDES

**N81-31196\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **AIRCRAFT ENGINE DIAGNOSTICS**

Jul. 1981 377 p refs Conf. held at Cleveland, 6-7 May 1981 (NASA-CP-2190; E-845) Avail: NTIS HC A17/MF A01 CSDL 21E

AIRCRAFT ENGINES, CONFERENCES, ENGINE MONITORING INSTRUMENTS, ENGINE TESTS, MAINTENANCE, RELIABILITY ENGINEERING

**N82-13142\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **NUMERICAL ANALYSIS OF THE SCRAMJET-INLET FLOW FIELD BY USING TWO-DIMENSIONAL NAVIER-STOKES EQUATIONS**

A. KUMAR Dec. 1981 30 p refs

(NASA-TP-1940; L-14776) Avail: NTIS HC A03/MF A01 CSDL 21E

COMPUTER PROGRAMS, ENGINE INLETS, FINITE DIFFERENCE THEORY, FLOW DISTRIBUTION, INLET FLOW, NAVIER-STOKES EQUATION, SUPERSONIC COMBUSTION RAMJET ENGINES

**N82-13143\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **EFFECT OF FUEL-AIR-RATIO NONUNIFORMITY ON EMISSIONS OF NITROGEN OXIDES**

V. J. LYONS Nov. 1981 14 p refs

(NASA-TP-1798; E-648) Avail: NTIS HC A02/MF A01 CSDL 21E

EXHAUST EMISSION, FUEL COMBUSTION, FUEL-AIR RATIO, NITROGEN OXIDES, NONUNIFORM FLOW, PREMIXING

**N82-14090\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **GAS TURBINE CERAMIC-COATED-VANE CONCEPT WITH CONVECTION-COOLED POROUS METAL CORE**

A. F. KASCAK (AVRADCOM Research and Technology Labs., Cleveland), C. H. LIEBERT, R. F. HANDSCHUH, and L. P. LUDWIG Dec. 1981 14 p refs Sponsored in part by U.S.

Army Aviation Research and Development Command, St. Louis (NASA-TP-1942; AVRADCOM-TR-81-C-7; E-732) Avail: NTIS HC A02/MF A01 CSDL 21E

CERAMIC COATINGS, CONVECTION, GAS TURBINES, HEAT TRANSFER, METAL SURFACES, POROUS MATERIALS, THICKNESS, VANES

## 07 AIRCRAFT PROPULSION AND POWER

**N82-15039\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPUTER PROGRAM FOR AERODYNAMIC AND BLADING DESIGN OF MULTISTAGE AXIAL-FLOW COMPRESSORS**

J. E. CROUSE and W. T. GORRELL Dec. 1981 105 p refs  
Prepared in cooperation with Army Aviation Research and Development Command, St. Louis, Mo.  
(NASA-TP-1946; AVRADCOM-TR-80-C-21; E-280) Avail: NTIS HC A06/MF A01 CSCL 21E

AERODYNAMIC CHARACTERISTICS, AIRFOIL PROFILES, COMPRESSIBLE FLOW, COMPRESSOR BLADES, COMPUTER AIDED DESIGN, TURBOCOMPRESSORS

**N82-15040\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF FUEL INJECTOR TYPE ON PERFORMANCE AND EMISSIONS OF REVERSE-FLOW COMBUSTOR**

C. T. NORGREN and S. M. RIDDLEBAUGH Dec. 1981 40 p refs  
(NASA-TP-1945; E-556) Avail: NTIS HC A03/MF A01 CSCL 21E

COMBUSTION CHAMBERS, FUEL INJECTION, GAS TURBINE ENGINES, PERFORMANCE TESTS

**N82-19222\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.63 AND 1.78, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 1.82**

R. D. MOORE and L. REID Feb. 1982 112 p refs  
(NASA-TP-1974; E-259) Avail: NTIS HC A06/MF A01 CSCL 21E

ASPECT RATIO, COMPRESSOR BLADES, COMPRESSOR ROTORS, INTAKE SYSTEMS, PRESSURE RATIO, STATOR BLADES, TRANSONIC COMPRESSORS

**N82-20183\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**DAMPING SEALS FOR TURBOMACHINERY**

G. L. VONPRAGENAU Mar. 1982 28 p refs  
(NASA-TP-1987; NAS 1.60:1987; M-373) Avail: NTIS HC A03/MF A01 CSCL 21E

DAMPERS (VALVES), ROTOR SPEED, SEALS (STOPPERS), TURBOMACHINERY

**N82-22269\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.63 AND 1.77, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 2.05**

R. D. MOORE and L. REID Apr. 1982 116 p refs  
(NASA-TP-2001; E-334; NAS 1.60:2001) Avail: NTIS HC A06/MF A01 CSCL 21E

AERODYNAMIC STALLING, AXIAL FLOW, COMPRESSOR ROTORS, PRESSURE RATIO, ROTOR BLADES (TURBOMACHINERY)

**N82-25250\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**STGSTK: A COMPUTER CODE FOR PREDICTING MULTISTAGE AXIAL FLOW COMPRESSOR PERFORMANCE BY A MEANLINE STAGE STACKING METHOD**

R. J. STEINKE May 1982 65 p refs  
(NASA-TP-2020; E-551; NAS 1.60:2020) Avail: NTIS HC A04/MF A01 CSCL 21E

AXIAL FLOW, COMPRESSOR EFFICIENCY, COMPUTER PROGRAMS, FORTRAN, TURBOCOMPRESSORS

**N82-31329\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**VENTURI NOZZLE EFFECTS ON FUEL DROP SIZE AND NITROGEN OXIDE EMISSIONS**

S. M. JOHNSON Aug. 1982 17 p refs  
(NASA-TP-2028; E-1029; NAS 1.60:2028) Avail: NTIS HC A02/MF A01 CSCL 21E

DROP SIZE, EXHAUST GASES, NITROGEN OXIDES, NOZZLE FLOW, SPRAY CHARACTERISTICS, VENTURI TUBES

**N82-33389\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROTOR TIP CLEARANCE EFFECTS ON OVERALL AND BLADE-ELEMENT PERFORMANCE OF AXIAL-FLOW TRANSONIC FAN STAGE**

R. D. MOORE Sep. 1982 87 p refs  
(NASA-TP-2049; E-559; NAS 1.60:2049) Avail: NTIS HC A05/MF A01 CSCL 21E

AXIAL FLOW TURBINES, BLADE TIPS, CLEARANCES, ROTOR BLADES

**N83-10045\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FURTHER INDUSTRIAL TESTS OF CERAMIC THERMAL BARRIER COATINGS**

C. H. LIEBERT and S. R. LEVINE Sep. 1982 10 p refs  
(NASA-TP-2057; E-1184; NAS 1.60:2057) Avail: NTIS HC A02/MF A01 CSCL 21E

CERAMICS, DIESEL ENGINES, METAL BONDING, PLASMA SPRAYING, THERMAL CONTROL COATINGS, THICKNESS

**N83-11125\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF STATOR ENDWALL CONTOURING IN A SMALL AXIAL-FLOW TURBINE. 1: STATOR PERFORMANCE**

J. E. HAAS Oct. 1982 26 p refs  
(NASA-TP-2023; E-1180; NAS 1.60:2023; AVRADCOM-TR-82-C-4) Avail: NTIS HC A03/MF A01 CSCL 21E

AXIAL FLOW TURBINES, CONTOURS, FLOW DISTRIBUTION, KINETIC ENERGY, STATORS, WALLS

**N83-11126\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FILM THICKNESS MEASUREMENT FOR SPIRAL GROOVE AND RAYLEIGH STEP LIFT PAD SELF-ACTING FACE SEALS**

E. DIRUSSO Oct. 1982 21 p refs  
(NASA-TP-2058; E-1169; NAS 1.60:2058) Avail: NTIS HC A02/MF A01 CSCL 21E

CLEARANCES, FILM THICKNESS, GAS BEARINGS, SEALS (STOPPERS), TORQUE

**N83-17547\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AERODYNAMIC EFFECT OF A HONEYCOMB ROTOR TIP SHROUD ON A 50.8-CENTIMETER-TIP-DIAMETER CORE TURBINE**

T. P. MOFFITT and W. J. WHITNEY Jan. 1983 19 p refs  
(NASA-TP-2112; E-1261; NAS 1.60:2112) Avail: NTIS HC A02/MF A01 CSCL 21E

AERODYNAMIC CHARACTERISTICS, BLADE TIPS, COOLANTS, ROTORS, SHROUDED TURBINES, TURBOMACHINERY

## 07 AIRCRAFT PROPULSION AND POWER

**N83-18727\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**IGNITION OF SIH4-H2-O2-N2 BEHIND REFLECTED SHOCK WAVES**

A. G. MCLAIN, C. J. JACHIMOWSKI, and R. C. ROGERS Feb. 1983 17 p refs  
 (NASA-TP-2114; L-15534; NAS 1.60:2114) Avail: NTIS HC  
 A02/MF A01 CSCL 21E

HYDROGEN, IGNITION, MIXTURES, OXYGEN, REACTION KINETICS, SHOCK WAVES, SILANES

**N83-23309\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EFFECT OF FLAMEHOLDER PRESSURE DROP ON EMISSIONS AND PERFORMANCE OF PREMIXED-PREVAPORIZED COMBUSTORS**

R. A. DUERR and V. J. LYONS Apr. 1983 22 p refs  
 (NASA-TP-2131; E-1358; NAS 1.60:2131) Avail: NTIS HC  
 A02/MF A01 CSCL 21E

COMBUSTION EFFICIENCY, EXHAUST EMISSION, FLAME HOLDERS, PREMIXED FLAMES, PRESSURE REDUCTION, PREVAPORIZATION

**N83-24509\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**PARTICLE SIZING BY MEASUREMENT OF FORWARD-SCATTERED LIGHT AT TWO ANGLES**

D. R. BUCHELE May 1983 25 p refs  
 (NASA-TP-2156; E-1179; NAS 1.60:2156) Avail: NTIS HC  
 A02/MF A01 CSCL 20F

FORWARD SCATTERING, GAS TURBINE ENGINES, LIGHT SCATTERING, PARTICLE SIZE DISTRIBUTION, SPRAYERS

**N83-25712\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**DESIGN ANALYSIS OF A SELF-ACTING SPIRAL-GROOVE RING SEAL FOR COUNTER-ROTATING SHAFTS**

E. DIRUSSO May 1983 12 p refs  
 (NASA-TP-2142; E-1253; NAS 1.60:2142) Avail: NTIS HC  
 A02/MF A01 CSCL 11A

COMPUTER PROGRAMS, GAS BEARINGS, GROOVES, LIFT, SEALS (STOPPERS), TURBOFAN ENGINES

**N83-26839\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**THRUST PERFORMANCE OF A VARIABLE-GEOMETRY, DIVERGENT EXHAUST NOZZLE ON A TURBOJET ENGINE AT ALTITUDE**

D. M. STRAIGHT and R. R. COLLOM Jun. 1983 39 p refs  
 (NASA-TP-2171; E-1451; NAS 1.60:2171) Avail: NTIS HC  
 A03/MF A01 CSCL 21E

EXHAUST NOZZLES, THRUST REVERSAL, THRUST VECTOR CONTROL, TURBOJET ENGINES

**N83-29208\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**COMBUSTION FUNDAMENTALS RESEARCH**

Washington Mar. 1983 252 p refs Proc. of conf. held in Cleveland, 21-22 Oct. 1982  
 (NASA-CP-2268; E-1525; NAS 1.55:2268) Avail: NTIS HC  
 A12/MF A01 CSCL 21E

AEROSPACE INDUSTRY, CHEMICAL REACTIONS, COMBUSTION PHYSICS, CONFERENCES, GAS TURBINES, HYDRODYNAMICS, PREMIXING, REACTION KINETICS

**N83-30431\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**INCIDENCE LOSS FOR FAN TURBINE ROTOR BLADE IN TWO-DIMENSIONAL CASCADE**

J. F. KLINE, T. P. MOFFITT, and R. G. STABE Jul. 1983 11 p refs  
 (NASA-TP-2188; E-1587; NAS 1.60:2188) Avail: NTIS HC  
 A02/MF A01 CSCL 21E

ENERGY DISSIPATION, FAN BLADES, INCIDENCE, ROTOR AERODYNAMICS, TURBOFAN ENGINES, TWO DIMENSIONAL FLOW

**N83-32806\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**MODELING INTERFACE MOTION OF COMBUSTION (MINOC). A COMPUTER CODE FOR TWO-DIMENSIONAL, UNSTEADY TURBULENT COMBUSTION**

A. F. GHONEIM (California Univ., Berkeley), C. J. MAREK, and A. K. OPPENHEIM (California Univ., Berkeley) Aug. 1983 19 p refs  
 (NAG3-313)

(NASA-TP-2132; E-1569; NAS 1.60:2132) Avail: NTIS HC  
 A02/MF A01 CSCL 21E

COMBUSTIBLE FLOW, FLAME PROPAGATION, TURBULENT FLOW, TWO DIMENSIONAL FLOW, VORTICES

**N83-32807\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPUTER CODE FOR OFF-DESIGN PERFORMANCE ANALYSIS OF RADIAL-INFLOW TURBINES WITH ROTOR BLADE SWEEP**

P. L. MEITNER (Army Aviation Research and Development Command, St. Louis, Mo.) and A. J. GLASSMAN Aug. 1983 26 p refs

(NASA-TP-2199; NAS 1.60:2199; AVRADCOM-TR-83-C-4) Avail: NTIS HC A03/MF A01 CSCL 21E

RADIAL FLOW, ROTOR BLADES (TURBOMACHINERY), TURBINES

**N83-33893\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PRELIMINARY TESTS OF AN ADVANCED HIGH-TEMPERATURE COMBUSTION SYSTEM**

J. D. WEAR, A. M. TROUT, J. M. SMITH, and R. E. JACOBS Sep. 1983 33 p refs

(NASA-TP-2203; E-1633; NAS 1.60:2203) Avail: NTIS HC  
 A03/MF A01 CSCL 21E

AIR FLOW, COMBUSTION, COMBUSTION CHAMBERS, COOLING, ENGINE INLETS, IGNITION, STOICHIOMETRY

**N83-34941\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF PERCENTAGE OF BLOCKAGE AND FLAMEHOLDER DOWNSTREAM COUNTERBORES ON LEAN COMBUSTION LIMITS OF PREMIXED, PREVAPORIZED PROPANE-AIR MIXTURE**

M. A. B. FERNANDEZ Sep. 1983 11 p refs  
 (NASA-TP-2227; E-1588; NAS 1.60:2227) Avail: NTIS HC  
 A02/MF A01 CSCL 21E

COMBUSTION, COMBUSTION CHAMBERS, FLAMES, FUEL INJECTION, MIXTURES, PROPANE

**N84-10055\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AIRCRAFT ELECTRIC SECONDARY POWER**

Washington Jun. 1983 199 p refs Workshop held in Cleveland, 14-15 Sep. 1982

(NASA-CP-2282; E-1632; NAS 1.55:2282) Avail: NTIS HC  
 A09/MF A01 CSCL 01C

AUXILIARY POWER SOURCES, CONFERENCES, ELECTRIC GENERATORS, ELECTRIC POWER SUPPLIES, FIGHTER AIRCRAFT, JET ENGINES

## 07 AIRCRAFT PROPULSION AND POWER

**N84-11171\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **F100 MULTIVARIABLE CONTROL SYNTHESIS PROGRAM. COMPUTER IMPLEMENTATION OF THE F100 MULTIVARIABLE CONTROL ALGORITHM**

J. F. SOEDER Oct. 1983 46 p  
(NASA-TP-2231; E-1496; NAS 1.60:2231) Avail: NTIS HC A03/MF A01 CSCL 21E

CONTROL THEORY, ENGINE DESIGN, TURBOFAN ENGINES

**N84-16181\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **DYNAMIC BEHAVIOR OF SPIRAL-GROOVE AND RAYLEIGH-STEP SELF-ACTING FACE SEALS**

E. DIRUSSO Jan. 1984 19 p refs  
(NASA-TP-2266; NAS 1.60:2266; E-1754) Avail: NTIS HC A02/MF A01 CSCL 21E

DYNAMIC RESPONSE, FILM THICKNESS, GAS BEARINGS, HYDRODYNAMICS, SEALS (STOPPERS), VIBRATION

**N84-20525\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **COMBUSTION FUNDAMENTALS RESEARCH**

Washington Apr. 1984 303 p refs Conf. held in Cleveland, 16-18 Apr. 1984

(NASA-CP-2309; E-2062; NAS 1.55:2309) Avail: NTIS HC A14/MF A01 CSCL 21E

COMBUSTION PHYSICS, COMPUTATIONAL FLUID DYNAMICS, CONFERENCES, FLUID FLOW, FUEL SPRAYS, GAS TURBINE ENGINES

**N84-20562\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **FORMULATION OF BLADE-FLUTTER SPECTRAL ANALYSES IN STATIONARY REFERENCE FRAME**

A. P. KURKOV Mar. 1984 32 p refs  
(NASA-TP-2296; E-1888; NAS 1.60:2296) Avail: NTIS HC A03/MF A01 CSCL 21E

AEROELASTICITY, AIRFOILS, FLUTTER, SPECTRUM ANALYSIS

**N84-21549\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **ANALYSIS OF A TOPPING-CYCLE, AIRCRAFT, GAS-TURBINE-ENGINE SYSTEM WHICH USES CRYOGENIC FUEL**

G. E. TURNEY and L. H. FISHBACH Apr. 1984 23 p refs  
Presented at the AIAA Aircraft Systems and Operational Meeting, Fort Worth, Tex., 17-19 Oct. 1983  
(NASA-TP-2294; E-1735; NAS 1.60:2294) Avail: NTIS HC A02/MF A01 CSCL 21E

AIRCRAFT ENGINES, AIRCRAFT FUELS, GAS TURBINE ENGINES, HYDROGEN FUELS, LIQUID HYDROGEN, THERMODYNAMIC CYCLES, TOPPING CYCLE ENGINES

**N84-23630\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **ASSESSMENT OF ALTERNATIVE AIRCRAFT FUELS**

Washington Apr. 1984 188 p refs Conf. held in Cleveland, 2-3 Nov. 1983

(NASA-CP-2307; E-1878; NAS 1.55:2307) Avail: NTIS HC A09/MF A01 CSCL 21D

COMBUSTION, CONFERENCES, CRUDE OIL, FUEL PRODUCTION, FUEL SYSTEMS, GAS TURBINE ENGINES, JET ENGINE FUELS, PETROLEUM PRODUCTS

**N84-24578\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **LEWIS RESEARCH CENTER SPIN RIG AND ITS USE IN VIBRATION ANALYSIS OF ROTATING SYSTEMS**

G. V. BROWN, R. E. KIELB, E. H. MEYN, R. E. MORRIS, and S. J. POSTA May 1984 19 p refs  
(NASA-TP-2304; E-1829; NAS 1.60:2304) Avail: NTIS HC A02/MF A01 CSCL 21E

COMPRESSOR ROTORS, DIGITAL TECHNIQUES, DYNAMIC STRUCTURAL ANALYSIS, SHAKERS, SPIN TESTS, TURBINE ENGINES, TURBOMACHINERY, VIBRATION, VIBRATION SIMULATORS

**N84-28795\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **DETAILED FLOW MEASUREMENTS IN CASING BOUNDARY LAYER OF 429-METER-PER-SECOND-TIP-SPEED TWO-STAGE FAN**

W. T. GORRELL Jan. 1984 33 p refs Prepared in cooperation with Army Aviation Research and Development Command, Cleveland

(NASA-TP-2052; E-219; NAS 1.60:2052; AVRADCOM-TR-81-C-28) Avail: NTIS HC A03/MF A01 CSCL 21E

FAN BLADES, FLOW MEASUREMENT, TURBINE BLADES, TURBOMACHINERY

**N84-32388\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF STATOR ENDWALL COUNTOURING IN A SMALL AXIAL-FLOW TURBINE**

J. E. HAAS and R. J. BOYLE Sep. 1984 23 p refs Prepared in cooperation with Army Research and Technology Labs., Cleveland

(NASA-TP-2309; E-2050; NAS 1.60:2309; AVSCOM-TR-84-C-5) Avail: NTIS HC A02/MF A01 CSCL 21E

AXIAL FLOW TURBINES, COMPUTER PROGRAMS, CONTOURS, PRESSURE GRADIENTS, STATORS, TIP DRIVEN ROTORS

**N85-10064\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **COMBUSTION GAS PROPERTIES I-ASTM JET A FUEL AND DRY AIR**

R. E. JONES, A. M. TROUT, J. D. WEAR, and B. J. MCBRIDE Oct. 1984 12 p refs Document incl. microfiche supplement  
(NASA-TP-2359; NAS 1.60:2359) Avail: NTIS HC E03/MF A01 CSCL 21E

COMBUSTION PRODUCTS, FUEL COMBUSTION, GAS COMPOSITION, GASES, JET ENGINE FUELS, THERMODYNAMIC PROPERTIES

**N85-10065\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **COMPARISON OF NUMERICAL TECHNIQUES FOR INTEGRATION OF STIFF ORDINARY DIFFERENTIAL EQUATIONS ARISING IN COMBUSTION CHEMISTRY**

K. RADHAKRISHNAN Oct. 1984 41 p refs Sponsored in part by Michigan Univ. and NRC  
(NAG3-147; NAG3-294)

(NASA-TP-2372; E-2149; NAS 1.60:2372) Avail: NTIS HC A03/MF A01 CSCL 21E

ALGORITHMS, COMBUSTION CHEMISTRY, COMBUSTION EFFICIENCY, NUMERICAL ANALYSIS, REACTION KINETICS, STIFFNESS

## 07 AIRCRAFT PROPULSION AND POWER

**N85-21168\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**COMBUSTION GAS PROPERTIES. 2: NATURAL GAS FUEL AND DRY AIR**

J. D. WEAR, R. E. JONES, A. M. TROUT, and B. J. MCBRIDE  
Apr. 1985 12 p refs  
(NASA-TP-2435; E-2435; NAS 1.60:2435) Avail: NTIS HC  
A02/MF A01 CSCL 21E

COMBUSTION, COMBUSTION PRODUCTS, FUEL-AIR RATIO, HYDROCARBON FUELS, NATURAL GAS

**N85-22394\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**EFFECTS OF INLET DISTORTION ON A STATIC PRESSURE PROBE MOUNTED ON THE ENGINE HUB IN AN F-15 AIRPLANE**

D. L. HUGHES, L. P. MYERS, and K. G. MACKALL 1985 23 p refs  
(NASA-TP-2411; H-1182; NAS 1.60:2411) Avail: NTIS HC  
A02/MF A01 CSCL 21E

AIRCRAFT ENGINES, ENGINE FAILURE, F-15 AIRCRAFT, INLET FLOW, STATIC PRESSURE, TURBOFAN ENGINES

**N85-22395\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**IGNITION OF MIXTURES OF SIH SUB 4, CH SUB 4, O SUB 2, AND AR OR N SUB 2 BEHIND REFLECTED SHOCK WAVES**

A. G. MCLAIN, C. J. JACHIMOWSKI, and R. C. ROGERS Apr. 1985 17 p refs  
(NASA-TP-2415; L-15881; NAS 1.60:2415) Avail: NTIS HC  
A02/MF A01 CSCL 21E

FUEL COMBUSTION, IGNITION, METHANE, REACTION KINETICS, SHOCK WAVES, SILANES

**N85-25261\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**PERFORMANCE AND SURGE LIMITS OF A TF30-P-3 TURBOFAN ENGINE/AXISYMMETRIC MIXED-COMPRESSION INLET PROPULSION SYSTEM AT MACH 2.5**

J. F. WASSERBAUER, H. E. NEUMANN, and R. J. SHAW May 1985 21 p refs  
(NASA-TP-2461; E-2412; NAS 1.60:2461) Avail: NTIS HC  
A02/MF A01 CSCL 21E

ANGLE OF ATTACK, INLET AIRFRAME CONFIGURATIONS, INTAKE SYSTEMS, PROPULSION SYSTEM PERFORMANCE, TURBOFAN ENGINES

**N85-28944\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**ADVANCED SECONDARY POWER SYSTEM FOR TRANSPORT AIRCRAFT**

A. C. HOFFMAN, I. G. HANSEN, R. F. BEACH, R. M. PLENCNER, R. P. DENGLER, K. S. JEFFERIES, and R. J. FRYE May 1985 38 p refs  
(NASA-TP-2463; E-2434; NAS 1.60:2463) Avail: NTIS HC  
A03/MF A01 CSCL 21E

AIRCRAFT POWER SUPPLIES, COMPUTER AIDED DESIGN, FLIGHT CONTROL, TRANSPORT AIRCRAFT

**N85-31058\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**COMBUSTION GAS PROPERTIES. PART 3: HYDROGEN GAS FUEL AND DRY AIR**

J. D. WEAR, R. E. JONES, B. J. MCBRIDE, and R. A. BEYERLE (Sverdrup Technology, Inc.) Jun. 1985 12 p refs Doc. includes microfiche supplement  
(NAS3-24105)

(NASA-TP-2477; E-2545; NAS 1.60:2477) Avail: NTIS HC  
A02/MF A01 CSCL 07D

CHEMICAL EQUILIBRIUM, COMBUSTION, COMPUTER PROGRAMS, GAS COMPOSITION, GAS MIXTURES, HYDROGEN FUELS

**N86-15313\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DYNAMIC RESPONSE OF FILM THICKNESS IN SPIRAL-GROOVE FACE SEALS**

E. DIRUSSO Dec. 1985 22 p refs  
(NASA-TP-2544; E-2683; NAS 1.60:2544) Avail: NTIS HC  
A02/MF A01 CSCL 21E

DYNAMIC RESPONSE, FILM THICKNESS, GAS BEARINGS, GROOVES, SEALS (STOPPERS)

**N86-22576\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC INVESTIGATION OF CIRCULAR-TO-RECTANGULAR TRANSITION DUCTS FOR HIGH-ASPECT-RATIO NONAXISYMMETRIC NOZZLES**

J. R. BURLEY, II, L. S. BANGERT, and J. R. CARLSON Mar. 1986 55 p refs  
(NASA-TP-2534; L-15874; NAS 1.60:2534) Avail: NTIS HC  
A04/MF A01 CSCL 21E

HIGH ASPECT RATIO, STATIC TESTS, WIND TUNNEL TESTS

**N86-24694\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LOW-SPEED PERFORMANCE OF AN AXISYMMETRIC, MIXED-COMPRESSION, SUPERSONIC INLET WITH AUXILIARY INLETS**

C. J. TREFNY and J. W. WASSERBAUER Feb. 1986 63 p refs  
(NASA-TP-2557; E-2771; NAS 1.60:2557) Avail: NTIS HC  
A04/MF A01 CSCL 21E

INTERNAL COMPRESSION INLETS, LOW SPEED, SUPERSONIC AIRCRAFT, SUPERSONIC INLETS

**N86-25342\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**DIGITAL ELECTRONIC ENGINE CONTROL (DEEC) FLIGHT EVALUATION IN AN F-15 AIRPLANE**

Mar. 1984 243 p refs Symposium held in Edwards, Calif., 25-26 May 1983  
(NASA-CP-2298; H-1201; NAS 1.55:2298) Avail: NTIS HC  
A11/MF A01 CSCL 21E

CONFERENCES, DIGITAL TECHNIQUES, ENGINE CONTROL, F-15 AIRCRAFT, FLIGHT TESTS, NUMERICAL CONTROL, THRUST CONTROL, TURBOFAN ENGINES

## 08

### AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

**N78-12100\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**PHUGOID CHARACTERISTICS OF A YF-12 AIRPLANE WITH VARIABLE-GEOMETRY INLETS OBTAINED IN FLIGHT TESTS AT A MACH NUMBER OF 2.9**

B. G. POWERS Dec. 1977 45 p refs  
(NASA-TP-1107; H-953) Avail: NTIS HC A03/MF A01 CSCL 01C

FLIGHT TESTS, INTAKE SYSTEMS, LONGITUDINAL CONTROL, OSCILLATIONS, YF-12 AIRCRAFT



**N78-13071\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF CONTROL INPUTS ON THE ESTIMATION OF STABILITY AND CONTROL PARAMETERS OF A LIGHT AIRPLANE**

R. L. CANNADAY and W. T. SUIT Dec. 1977 72 p refs  
(NASA-TP-1043; L-11355) Avail: NTIS HC A04/MF A01  
CSCL 01C

AERODYNAMIC STABILITY, CONTROLLABILITY, ESTIMATION, INPUT/OUTPUT ROUTINES, LIGHT AIRCRAFT, PARAMETERIZATION

**N78-16063\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**STUDY OF THE APPLICATION OF AN IMPLICIT MODEL-FOLLOWING FLIGHT CONTROLLER TO LIFT-FAN VTOL AIRCRAFT**

V. K. MERRICK Nov. 1977 180 p refs  
(NASA-TP-1040; A-6712) Avail: NTIS HC A09/MF A01 CSCL 01C

AUTOMATIC FLIGHT CONTROL, CONTROLLABILITY, LIFT FANS, VERTICAL TAKEOFF AIRCRAFT

**N78-18076\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**ANALYTICAL STUDY OF RIDE SMOOTHING BENEFITS OF CONTROL SYSTEM CONFIGURATIONS OPTIMIZED FOR PILOT HANDLING QUALITIES**

B. G. POWERS Feb. 1978 60 p refs  
(NASA-TP-1148; H-922) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT CONTROL, CONTROL CONFIGURED VEHICLES, PILOT PERFORMANCE, RIDING QUALITY

**N78-20139\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATOR EVALUATION OF A FLIGHT-PATH-ANGLE CONTROL SYSTEM FOR A TRANSPORT AIRPLANE WITH DIRECT LIFT CONTROL**

W. W. KELLEY Mar. 1978 33 p refs  
(NASA-TP-1116; L-11947) Avail: NTIS HC A03/MF A01 CSCL 01C

AIRCRAFT CONTROL, FLIGHT PATHS, FLIGHT SIMULATORS, LIFT, TRANSPORT AIRCRAFT

**N78-20140\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**FLIGHT EVALUATION OF THE TRANSONIC STABILITY AND CONTROL CHARACTERISTICS OF AN AIRPLANE INCORPORATING A SUPERCRITICAL WING**

N. W. MATHENY and D. H. GATLIN Feb. 1978 61 p refs  
(NASA-TP-1167; H-916) Avail: NTIS HC A04/MF A01 CSCL 01C

AERODYNAMIC STABILITY, AIRCRAFT CONTROL, FLIGHT TESTS, SUPERCRITICAL WINGS, TRANSONIC SPEED

**N78-20142\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STUDY OF THE USE OF A NONLINEAR, RATE-LIMITED FILTER ON PILOT CONTROL SIGNALS**

J. J. ADAMS Apr. 1978 41 p refs  
(NASA-TP-1147; L-11762) Avail: NTIS HC A03/MF A01 CSCL 01C

AIRCRAFT NOISE, AIRCRAFT PERFORMANCE, FEEDBACK CONTROL, NONLINEAR FILTERS, PILOT PERFORMANCE

**N78-20143\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PILOT-MODEL ANALYSIS AND SIMULATION STUDY OF EFFECT OF CONTROL TASK DESIRED CONTROL RESPONSE**

J. J. ADAMS, J. GERA, and J. B. JAUDON Apr. 1978 46 p refs

(NASA-TP-1140) Avail: NTIS HC A03/MF A01 CSCL 01C  
AIRCRAFT CONTROL, ALTITUDE CONTROL, F-8 AIRCRAFT, FLIGHT SIMULATION, PILOT PERFORMANCE

**N78-21160\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**RESULTS FROM FLIGHT AND SIMULATOR STUDIES OF A MACH 3 CRUISE LONGITUDINAL AUTOPILOT**

G. B. GILYARD and J. W. SMITH Apr. 1978 85 p refs  
(NASA-TP-1180; H-940) Avail: NTIS HC A05/MF A01 CSCL 01D

CONTROL SIMULATION, FLIGHT TESTS, LONGITUDINAL CONTROL, MACH NUMBER

**N78-23100\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**OPTIMAL GUIDANCE AND CONTROL FOR INVESTIGATING AIRCRAFT NOISE-IMPACT REDUCTION**

E. C. STEWART and T. M. CARSON May 1978 58 p refs  
(NASA-TP-1237; A-7121) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT NOISE, NOISE REDUCTION, THRUST VECTOR CONTROL

**N78-25101\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MODAL CONTROL THEORY AND APPLICATION TO AIRCRAFT LATERAL HANDLING QUALITIES DESIGN**

S. SRINATHKUMAR Jun. 1978 63 p refs  
(NASA-TP-1234; L-12177) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT DESIGN, CONTROL THEORY, CONTROLLABILITY, EIGENVALUES, EIGENVECTORS

**N78-26151\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**A FLIGHT INVESTIGATION OF THE STABILITY, CONTROL, AND HANDLING QUALITIES OF AN AUGMENTED JET FLAP STOL AIRPLANE**

R. F. VOMASKE, R. C. INNIS, B. E. SWAN (Canadian Armed Forces, Ottawa), and S. W. GROSSMITH (Canadian Dept. of Transport, Ottawa) Jun. 1978 147 p refs  
(NASA-TP-1254; A-7246) Avail: NTIS HC A07/MF A01 CSCL 01C

AIRCRAFT CONTROL, AIRCRAFT STABILITY, SHORT TAKEOFF AIRCRAFT

**N78-27136\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A FIGHTER MODEL WITH A CLOSE-COUPLED CANARD AT MACH NUMBERS FROM 0.40 TO 1.20**

R. J. RE and F. J. CAPONE Jul. 1978 80 p refs  
(NASA-TP-1206; L-12081) Avail: NTIS HC A05/MF A01 CSCL 01C

AERODYNAMIC CHARACTERISTICS, AIRCRAFT MODELS, CANARD CONFIGURATIONS

**N78-27138\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF ERRORS ON DECOUPLED CONTROL SYSTEMS**

H. A. HAMER and K. G. JOHNSON Jul. 1978 86 p refs  
(NASA-TP-1184; L-11959) Avail: NTIS HC A05/MF A01 CSCL 01C

DECOUPLING, ERROR ANALYSIS, LONGITUDINAL CONTROL, SHORT TAKEOFF AIRCRAFT

## 08 AIRCRAFT STABILITY AND CONTROL

**N78-30141\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SIMULATION STUDY OF THE OSCILLATORY LONGITUDINAL MOTION OF AN AIRPLANE AT THE STALL**  
W. H. PHILLIPS Aug. 1978 43 p refs  
(NASA-TP-1242; L-12064) Avail: NTIS HC A03/MF A01 CSDL 01C  
AERODYNAMIC STALLING, FLIGHT SIMULATION, LONGITUDINAL STABILITY

**N79-10068\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.  
**FLIGHT-DETERMINED STABILITY AND CONTROL DERIVATIVES FOR THE F-111 TACT RESEARCH AIRCRAFT**  
A. G. SIM and R. E. CURRY Oct. 1978 78 p refs  
(NASA-TP-1350; H-1004) Avail: NTIS HC A05/MF A01 CSDL 01C  
AIRCRAFT STABILITY, F-111 AIRCRAFT, STABILITY DERIVATIVES

**N79-13056\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.  
**FLIGHT COMPARISON OF THE TRANSONIC AGILITY OF THE F-111A AIRPLANE AND THE F-111 SUPERCRITICAL WING AIRPLANE**  
E. L. FRIEND and G. M. SAKAMOTO Dec. 1978 78 p refs  
(NASA-TP-1368; H-985) Avail: NTIS HC A05/MF A01 CSDL 01C  
AERODYNAMIC CHARACTERISTICS, ANIONS, F-111 AIRCRAFT, SUPERCRITICAL WINGS, TRANSONIC FLIGHT

**N79-13057\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**A NONLINEAR TRAJECTORY COMMAND GENERATOR FOR A DIGITAL FLIGHT-CONTROL SYSTEM**  
L. S. CICOLANI and S. WEISSENBERGER Nov. 1978 114 p refs  
(NASA-TP-1221; A-7074) Avail: NTIS HC A06/MF A01 CSDL 01C  
AUTOMATIC FLIGHT CONTROL, DIGITAL SYSTEMS, NONLINEAR SYSTEMS, TRAJECTORY CONTROL, V/STOL AIRCRAFT

**N79-14110\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**THEORETICAL STUDY OF THE EFFECT OF WIND VELOCITY GRADIENTS ON LONGITUDINAL STABILITY AND CONTROL IN CLIMBING AND LEVEL FLIGHT**  
W. L. SHERMAN Dec. 1978 21 p refs  
(NASA-TP-1332; L-12273) Avail: NTIS HC A02/MF A01 CSDL 01C  
CLIMBING FLIGHT, LONGITUDINAL CONTROL, LONGITUDINAL STABILITY, WIND VELOCITY

**N79-15970\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**DESIGN AND ANALYSIS OF AN ACTIVE JET CONTROL SYSTEM FOR HELICOPTER SLING LOADS** M.S. Thesis - Old Dominion Univ.  
M. D. PARDUE and J. D. SHAUGHNESSY Jan. 1979 35 p refs  
(NASA-TP-1397; L-11836) Avail: NTIS HC A03/MF A01 CSDL 01C  
HELICOPTERS, JET CONTROL, MATERIALS HANDLING

**N79-17872\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**CONFIGURATION MANAGEMENT AND AUTOMATIC CONTROL OF AN AUGMENTOR WING AIRCRAFT WITH VECTORED THRUST**  
L. S. CICOLANI, B. SRIDHAR, and G. MEYER Mar. 1979 138 p refs  
(NASA-TP-1222; A-7099) Avail: NTIS HC A07/MF A01 CSDL 01C  
FLIGHT CONTROL, POWERED LIFT AIRCRAFT, TRAJECTORY CONTROL, V/STOL AIRCRAFT

**N79-22113\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.  
**IMPORTANT FACTORS IN THE MAXIMUM LIKELIHOOD ANALYSIS OF FLIGHT TEST MANEUVERS**  
K. W. ILIFF, R. E. MAINE, and T. D. MONTGOMERY Apr. 1979 44 p refs  
(NASA-TP-1459; H-1076) Avail: NTIS HC A03/MF A01 CSDL 01C  
DYNAMIC TESTS, FLIGHT TESTS, MAXIMUM LIKELIHOOD ESTIMATES, NASA PROGRAMS

**N79-27182\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**A COMPARISON OF THE V/STOL HANDLING QUALITIES OF THE VAK-191B WITH THE REQUIREMENTS OF AGARD REPORT 577 AND MIL-F-83300**  
S. B. ANDERSON Jul. 1979 38 p refs  
(NASA-TP-1494; A-7117) Avail: NTIS HC A03/MF A01 CSDL 01C  
CONTROLLABILITY, V/STOL AIRCRAFT, VERTICAL TAKEOFF AIRCRAFT

**N79-28186\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**PREDICTING DYNAMIC PERFORMANCE LIMITS FOR SERVOSYSTEMS WITH SATURATING NONLINEARITIES**  
J. A. WEBB, JR. and R. A. BLECH Jul. 1979 52 p refs  
(NASA-TP-1488; E-9903) Avail: NTIS HC A04/MF A01 CSDL 01C  
DYNAMIC RESPONSE, NONLINEAR SYSTEMS, SERVO-MECHANISMS

**N79-29195\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**DESCRIPTION OF THE VTOL APPROACH AND LANDING TECHNOLOGY (VALT) CH-47 RESEARCH SYSTEM**  
J. R. KELLY, F. R. NIESSEN, J. F. GARREN, JR., and T. S. ABBOTT Aug. 1979 57 p refs  
(NASA-TP-1436; L-12781) Avail: NTIS HC A04/MF A01 CSDL 01C  
AIRBORNE/SPACEBORNE COMPUTERS, CH-47 HELICOPTER, FLIGHT CONTROL, SYSTEMS ENGINEERING, VERTICAL LANDING, VERTICAL TAKEOFF

**N79-31223\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**THEORETICAL AND EXPERIMENTAL INVESTIGATION OF GROUND-INDUCED EFFECTS FOR A LOW-ASPECT-RATIO HIGHLY SWEEPED ARROW-WING CONFIGURATION**  
P. L. COE, JR. and J. L. THOMAS Washington Sep. 1979 102 p refs  
(NASA-TP-1508; L-13088) Avail: NTIS HC A06/MF A01 CSDL 01C  
AERODYNAMIC CHARACTERISTICS, ARROW WINGS, GROUND EFFECT (AERODYNAMICS), V/STOL AIRCRAFT

**N79-33218\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**FIXED-BASE SIMULATION STUDY OF DECOUPLED LONGITUDINAL CONTROLS DURING APPROACH AND LANDING OF A MEDIUM JET TRANSPORT IN THE PRESENCE OF WIND SHEAR**

G. K. MILLER, JR. Oct. 1979 69 p  
 (NASA-TP-1519; L-12842) Avail: NTIS HC A04/MF A01  
 CSCL 01C

AIRCRAFT CONTROL, CONTROL SIMULATION, LONGITUDINAL CONTROL, WIND SHEAR

**N80-13052\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EFFECTS OF RELAXED STATIC LONGITUDINAL STABILITY ON A SINGLE-STAGE-TO-ORBIT VEHICLE DESIGN**

D. C. FREEMAN, JR. and A. W. WILHITE Washington Dec. 1979 138 p refs  
 (NASA-TP-1594; L-13243) Avail: NTIS HC A07/MF A01  
 CSCL 22B

AERODYNAMIC CHARACTERISTICS, LONGITUDINAL STABILITY, SPACECRAFT CONFIGURATIONS, SPACECRAFT DESIGN

**N80-14136\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SIMULATOR STUDY OF STALL/POST-STALL CHARACTERISTICS OF A FIGHTER AIRPLANE WITH RELAXED LONGITUDINAL STATIC STABILITY**

L. T. NGUYEN, M. E. OGBURN, W. P. GILBERT, K. S. KIBLER, P. W. BROWN, and P. L. DEAL Washington Dec. 1979 226 p  
 (NASA-TP-1538; L-12854) Avail: NTIS HC A11/MF A01  
 CSCL 01C

AERODYNAMIC STALLING, F-16 AIRCRAFT, FLIGHT SIMULATION, LONGITUDINAL STABILITY, STATIC STABILITY

**N80-15138\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**EFFECTS OF PRIMARY ROTOR PARAMETERS ON FLAPPING DYNAMICS**

R. T. N. CHEN Jan. 1980 63 p refs  
 (NASA-TP-1431; A-7777) Avail: NTIS HC A04/MF A01 CSCL 01A

FLAPPING HINGES, HELICOPTER PERFORMANCE, RIGID ROTORS, ROTARY WINGS, ROTOR AERODYNAMICS

**N80-17081\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**FLIGHT TESTS OF THE TOTAL AUTOMATIC FLIGHT CONTROL SYSTEM (TAFOS) CONCEPT ON A DHC-6 TWIN OTTER AIRCRAFT**

W. R. WEHREND, JR. and G. MEYER Feb. 1980 73 p refs  
 (NASA-TP-1513; A-7901) Avail: NTIS HC A04/MF A01 CSCL 01C

AUTOMATIC FLIGHT CONTROL, FLIGHT CHARACTERISTICS, SHORT TAKEOFF AIRCRAFT, VERTICAL TAKEOFF AIRCRAFT

**N80-19126\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**APPLICATION OF THE CONCEPT OF DYNAMIC TRIM CONTROL TO AUTOMATIC LANDING OF CARRIER AIRCRAFT**

G. A. SMITH and G. MEYER Apr. 1980 87 p refs  
 (NASA-TP-1512; A-7801) Avail: NTIS HC A05/MF A01 CSCL 01C

AIRCRAFT LANDING, AUTOMATIC LANDING CONTROL, DIGITAL TECHNIQUES, DYNAMIC CONTROL, FEEDFORWARD CONTROL

**N80-21336\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**DYNAMICS STABILITY DERIVATIVES OF SPACE SHUTTLE ORBITER OBTAINED FROM WIND-TUNNEL AND APPROACH AND LANDING FLIGHT TESTS**

D. C. FREEMAN, JR. Washington Apr. 1980 20 p refs  
 (NASA-TP-1634; L-13427) Avail: NTIS HC A02/MF A01  
 CSCL 01C

APPROACH AND LANDING TESTS (STS), DYNAMIC STABILITY, SPACE SHUTTLE ORBITERS, STABILITY DERIVATIVES, WIND TUNNEL TESTS

**N80-22358\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**DESCRIPTION OF AN EXPERIMENTAL (HYDROGEN PEROXIDE) ROCKET SYSTEM AND ITS USE IN MEASURING AILERON AND RUDDER EFFECTIVENESS OF A LIGHT AIRPLANE**

T. C. OBRYAN, M. W. GOODE, F. D. GREGORY, and M. H. MAYO May 1980 42 p refs  
 (NASA-TP-1647; L-12494) Avail: NTIS HC A03/MF A01  
 CSCL 01C

AILERONS, HYDROGEN PEROXIDE, LIGHT AIRCRAFT, ROCKET ENGINES, RUDDERS, SYSTEM EFFECTIVENESS

**N80-23326\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**NAVIGATION, GUIDANCE, AND CONTROL FOR HELICOPTER AUTOMATIC LANDINGS**

J. R. KELLY and F. R. NIESSEN May 1980 58 p refs  
 (NASA-TP-1649; L-13454) Avail: NTIS HC A04/MF A01  
 CSCL 01C

AUTOMATIC CONTROL, AUTOMATIC LANDING CONTROL, HELICOPTER CONTROL, NAVIGATION AIDS

**N80-23327\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.  
**PRECISION CONTROLLABILITY OF THE YF-17 AIRPLANE**

T. R. SISK and N. W. MATAENY May 1980 34 p refs  
 (NASA-TP-1677; H-1089) Avail: NTIS HC A03/MF A01 CSCL 01C

CONTROLLABILITY, F-17 AIRCRAFT, MANEUVERABILITY, TRACKING (POSITION)

**N80-24323\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**MAXIMUM LIKELIHOOD METHOD FOR ESTIMATING AIRPLANE STABILITY AND CONTROL PARAMETERS FROM FLIGHT DATA IN FREQUENCY DOMAIN**

V. KLEIN May 1980 60 p refs Prepared in cooperation with Joint Institutes for Advancement of Flight Sciences, Hampton, Va.  
 (NASA-TP-1637; L-13383) Avail: NTIS HC A04/MF A01  
 CSCL 01C

AIRCRAFT CONTROL, AIRCRAFT STABILITY, MAXIMUM LIKELIHOOD ESTIMATES

**N80-24324\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**FLUTTER ANALYSIS OF AN AIRPLANE WITH MULTIPLE STRUCTURAL NONLINEARITIES IN THE CONTROL SYSTEM**

E. J. BREITBACH Mar. 1980 39 p refs  
 (NASA-TP-1620; L-13356) Avail: NTIS HC A03/MF A01  
 CSCL 01C

AIRCRAFT CONFIGURATIONS, AIRCRAFT CONTROL, FLUTTER, NONLINEARITY, NUMERICAL ANALYSIS

## 08 AIRCRAFT STABILITY AND CONTROL

**N80-25345\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **MEASUREMENT OF THE HANDLING CHARACTERISTICS OF TWO LIGHT AIRPLANES**

Jun. 1980 80 p refs

(NASA-TP-1636; L-13054) Avail: NTIS HC A05/MF A01

CSSL 01C

CONTROLLABILITY, FLIGHT TESTS, GENERAL AVIATION AIRCRAFT

**N80-26328\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### **DEVELOPMENT AND FLIGHT TEST RESULTS OF AN AUTOTHROTTLE CONTROL SYSTEM AT MACH 3 CRUISE**

G. B. GILYARD and J. J. BURKEN Jul. 1980 40 p refs

(NASA-TP-1621; H-1090) Avail: NTIS HC A03/MF A01 CSSL

01C

AIRSPED, AUTOMATIC PILOTS, FLIGHT CONTROL, FLIGHT TESTS, MACH NUMBER, YF-12 AIRCRAFT

**N80-29369\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SINGLE-STAGE ELECTROHYDRAULIC SERVOSYSTEM FOR ACTUATING ON AIRFLOW VALVE WITH FREQUENCIES TO 500 HERTZ**

J. A. WEBB, JR., O. MEHMED, and C. F. LORENZO Aug. 1980 35 p refs

(NASA-TP-1678; E-252) Avail: NTIS HC A03/MF A01 CSSL

01C

ACTUATORS, AIR FLOW, ELECTRIC CONTROL, HYDRAULIC EQUIPMENT, SERVOMECHANISMS, VALVES

**N81-11044\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **FLIGHT EVALUATION OF STABILIZATION AND COMMAND AUGMENTATION SYSTEM CONCEPTS AND COCKPIT DISPLAYS DURING APPROACH AND LANDING OF POWERED-LIFT STOL AIRCRAFT**

J. A. FRANKLIN, R. C. INNIS, and G. H. HARDY Nov. 1980 94 p refs

(NASA-TP-1551; A-7968) Avail: NTIS HC A05/MF A01 CSSL 01C

AERODYNAMIC COEFFICIENTS, AERODYNAMIC STABILITY, APPROACH AND LANDING TESTS (STS), ATTITUDE CONTROL, SHORT TAKEOFF AIRCRAFT

**N81-12109\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SIMULATION COMPARISON OF A DECOUPLED LONGITUDINAL CONTROL SYSTEM AND A VELOCITY VECTOR CONTROL WHEEL STEERING SYSTEM DURING LANDINGS IN WIND SHEAR**

G. KIMBALL, JR. Nov. 1980 76 p refs

(NASA-TP-1734; L-13738) Avail: NTIS HC A05/MF A01

AIRCRAFT CONTROL, AIRCRAFT LANDING, PILOT PERFORMANCE, WIND SHEAR

**N81-13065\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PSEUDOSTEADY-STATE ANALYSIS OF NONLINEAR AIRCRAFT MANEUVERS**

J. W. YOUNG, A. A. SCHY, and K. G. JOHNSON Dec. 1980 64 p refs

(NASA-TP-1758; L-13743) Avail: NTIS HC A04/MF A01

CSSL 01C

AERODYNAMIC CHARACTERISTICS, AIRCRAFT MANEUVERS, FLIGHT CHARACTERISTICS, NONLINEAR EQUATIONS

**N81-13066\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **COMPARISON OF SPACE SHUTTLE ORBITER LOW-SPEED STATIC STABILITY AND CONTROL DERIVATIVES OBTAINED FROM WIND-TUNNEL AND APPROACH AND LANDING FLIGHT TESTS**

D. C. FREEMAN, JR. and B. SPENCER, JR. Dec. 1980 36 p refs

(NASA-TP-1779; L-13945) Avail: NTIS HC A03/MF A01

CSSL 01C

APPROACH AND LANDING TESTS (STS), FLIGHT TESTS, SPACE SHUTTLE ORBITERS, STATIC STABILITY, WIND TUNNEL TESTS

**N81-13968\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ECONOMIC EVALUATION OF FLYING-QUALITIES DESIGN CRITERIA FOR A TRANSPORT CONFIGURED WITH RELAXED STATIC STABILITY**

S. M. SLIWA Dec. 1980 30 p refs

(NASA-TP-1760; L-13944) Avail: NTIS HC A03/MF A01

CSSL 01C

AIRCRAFT DESIGN, CONSTRAINTS, DESIGN ANALYSIS, ECONOMIC ANALYSIS, OPTIMIZATION, PARAMETERIZATION, STABILITY AUGMENTATION, TRANSPORT AIRCRAFT

**N81-19131\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **FLIGHT-TEST EVALUATION OF STOL CONTROL AND FLIGHT DIRECTOR CONCEPTS IN A POWERED-LIFT AIRCRAFT FLYING CURVED DECELERATING APPROACHES**

W. S. HINDSON (National Research Council of Canada, Ottawa, Ontario), G. H. HARDY, and R. C. INNIS Mar. 1981 96 p refs

(NASA-TP-1641; A-8190) Avail: NTIS HC A05/MF A01 CSSL 01C

AIRCRAFT LANDING, APPROACH CONTROL, FLIGHT TESTS, INSTRUMENT LANDING SYSTEMS, MANUAL CONTROL, SHORT TAKEOFF AIRCRAFT

**N81-20082\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AN ANALYTICAL STUDY OF THE LONGITUDINAL RESPONSE OF AIRPLANES TO POSITIVE WIND SHEAR**

W. L. SHERMAN Mar. 1981 51 p refs

(NASA-TP-1765; L-13623) Avail: NTIS HC A04/MF A01

CSSL 01C

AIRCRAFT CONTROL, AIRCRAFT STABILITY, FLIGHT CONTROL, FLIGHT HAZARDS, TRANSPORT AIRCRAFT, WIND SHEAR

**N82-10041\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **DETERMINATION OF AIRPLANE MODEL STRUCTURE FROM FLIGHT DATA BY USING MODIFIED STEPWISE REGRESSION**

V. KLEIN (Joint Inst. for Advancement of Flight Sciences, Hampton, Va.), J. G. BATTERSON, and P. C. MURPHY Oct. 1981 48 p refs

(NASA-TP-1916; L-14613) Avail: NTIS HC A03/MF A01

CSSL 01C

AERODYNAMIC COEFFICIENTS, AIRCRAFT MODELS, REGRESSION ANALYSIS, STRUCTURAL DESIGN

**N82-15075\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LONGITUDINAL AND LATERAL STATIC STABILITY AND CONTROL CHARACTERISTICS OF A 1/6-SCALE MODEL OF A REMOTELY PILOTED RESEARCH VEHICLE WITH A SUPERCRITICAL WING**

T. A. BYRDSONG and J. B. HALLISSY May 1979 118 p refs (NASA-TP-1360; L-12059) Avail: NTIS HC A06/MF A01 CSCL 01C

FLIGHT SIMULATION, FLUTTER ANALYSIS, SUPERCRITICAL WINGS, TRANSONIC WIND TUNNELS

**N82-19225\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATOR STUDY OF VORTEX ENCOUNTERS BY A TWIN-ENGINE, COMMERCIAL, JET TRANSPORT AIRPLANE**

E. C. HASTINGS, JR. and G. L. KEYSER, JR. Feb. 1982 65 p refs (NASA-TP-1966; L-14187) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT HAZARDS, AIRCRAFT WAKES, COMMERCIAL AIRCRAFT, FLIGHT SIMULATION, FLOW DISTRIBUTION, TRANSPORT AIRCRAFT, VORTICES

**N82-20187\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**DESIGN CRITERIA FOR FLIGHTPATH AND AIRSPEED CONTROL FOR THE APPROACH AND LANDING OF STOL AIRCRAFT**

J. A. FRANKLIN, R. C. INNIS, G. H. HARDY, and J. D. STEPHENSON Mar. 1982 98 p refs (NASA-TP-1911; NAS 1.60:1911; A-8645) Avail: NTIS HC A05/MF A01 CSCL 01C

AERODYNAMICS, AIRSPEED, APPROACH CONTROL, FLIGHT PATHS, SHORT TAKEOFF AIRCRAFT

**N82-20188\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SELF-TUNING REGULATORS FOR MULTICYCLIC CONTROL OF HELICOPTER VIBRATION**

W. JOHNSON Mar. 1982 50 p refs (NASA-TP-1996; NAS 1.60:1996; A-8719) Avail: NTIS HC A03/MF A01 CSCL 01C

CONTROLLERS, HELICOPTERS, SELF ADAPTIVE CONTROL SYSTEMS, VIBRATION DAMPING

**N82-24209\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPLICATION OF MODAL CONTROL TO WING-FLUTTER SUPPRESSION**

A. J. OSTROFF and S. PINES (Analytical Mechanics Associates, Inc., Jericho, N.Y.) May 1982 73 p refs (NASA-TP-1983; L-14976; NAS 1.60:1983) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT DESIGN, CONTROL THEORY, FLUTTER ANALYSIS, UNSWEPT WINGS, WING OSCILLATIONS

**N83-11139\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**GAIN SELECTION METHOD AND MODEL FOR COUPLED PROPULSION AND AIRFRAME SYSTEMS**

P. C. MURPHY 4 Nov. 1982 33 p refs (NASA-TP-2067; L-15215; NAS 1.60:2067) Avail: NTIS HC A03/MF A01 CSCL 01C

AIRFRAMES, AUTOMATIC GAIN CONTROL, EIGENVALUES, FEEDBACK CONTROL, FLIGHT CONTROL, PROPULSION SYSTEM PERFORMANCE, TURBOFAN ENGINES

**N83-16350\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**THE APPLICATION OF PARAMETER ESTIMATION TO FLIGHT MEASUREMENTS TO OBTAIN LATERAL-DIRECTIONAL STABILITY DERIVATIVES OF AN AUGMENTED JET-FLAP STOL AIRPLANE**

J. D. STEPHENSON Jan. 1983 62 p refs (NASA-TP-2033; A-8977; NAS 1.60:2033) Avail: NTIS HC A04/MF A01 CSCL 01C

DIRECTIONAL STABILITY, FLIGHT TESTS, JET FLAPS, LATERAL STABILITY, PARAMETER IDENTIFICATION, SHORT TAKEOFF AIRCRAFT

**N83-19758\*#** George Washington Univ., Hampton, Va.

**DETERMINATION OF AIRPLANE MODEL STRUCTURE FROM FLIGHT DATA USING SPLINES AND STEPWISE REGRESSION**

V. KLEIN (George Washington Univ., Hampton, Va.) and J. G. BATTERSON Mar. 1983 52 p refs (NASA-TP-2126; L-15541; NAS 1.60:2126) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT MODELS, AIRCRAFT STRUCTURES, STRUCTURAL ANALYSIS

**N83-33896\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RESTRUCTURABLE CONTROLS**

R. J. MONTOYA, comp. (Research Triangle Inst., Research Triangle Park, N.C.), W. E. HOWELL, comp., W. T. BUNDICK, comp., A. J. OSTROFF, comp., R. M. HUESCHEN, comp., and C. M. BELCASTRO, comp. Aug. 1983 189 p refs Workshop held in Hampton, Va., 21-22 Sep. 1982

(NASA-CP-2277; L-15638; NAS 1.55:2277) Avail: NTIS HC A09/MF A01 CSCL 01C

AIRCRAFT INSTRUMENTS, AIRCRAFT SURVIVABILITY, AUTOMATIC FLIGHT CONTROL, CONFERENCES, RELIABILITY ENGINEERING, SELF REPAIRING DEVICES

**N84-12190\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATOR STUDY OF FLIGHT CHARACTERISTICS OF A LARGE TWIN-FUSELAGE CARGO TRANSPORT AIRPLANE DURING APPROACH AND LANDING**

W. D. GRANTHAM, P. L. DEAL, G. L. KEYSER, JR., and P. M. SMITH (Kentron International, Inc.) Nov. 1983 87 p refs (NASA-TP-2183; L-15505; NAS 1.60:2183) Avail: NTIS HC A05/MF A01 CSCL 01C

AIRCRAFT LANDING, APPROACH, CARGO AIRCRAFT, FLIGHT CHARACTERISTICS

**N84-13198\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**FLIGHT-TEST OF THE GLIDE-SLOPE TRACK AND FLARE-CONTROL LAWS FOR AN AUTOMATIC LANDING SYSTEM FOR A POWERED-LIFT STOL AIRPLANE**

D. M. WATSON, G. H. HARDY, and D. N. WARNER, JR. Dec. 1983 89 p refs (NASA-TP-2128; A-9199; NAS 1.60:2128) Avail: NTIS HC A05/MF A01 CSCL 01C

AIRCRAFT LANDING, AUTOMATIC CONTROL, GLIDE LANDINGS, POWERED LIFT AIRCRAFT, SHORT TAKEOFF AIRCRAFT

**N84-17184\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WIND-TUNNEL FREE-FLIGHT INVESTIGATION OF A MODEL OF A FORWARD-SWEPT-WING FIGHTER CONFIGURATION**

D. G. MURRI, L. T. NGUYEN, and S. B. GRAFTON Feb. 1984 71 p refs (NASA-TP-2230; L-15602; NAS 1.60:2230) Avail: NTIS HC A04/MF A01 CSCL 01C

ANGLE OF ATTACK, FIGHTER AIRCRAFT, STABILITY, SWEPT WINGS, WIND TUNNEL TESTS

## 08 AIRCRAFT STABILITY AND CONTROL

**N84-20567\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **NASA AIRCRAFT CONTROLS RESEARCH, 1983**

G. P. BEASLEY, comp. Mar. 1984 592 p refs Workshop held in Hampton, Va., 25-27 Oct. 1983 (NASA-CP-2296; L-15730; NAS 1.55:2296) Avail: NTIS HC A25/MF A01 CSCL 01C

AIRCRAFT DESIGN, AIRCRAFT GUIDANCE, AUGMENTATION, COMPUTERIZED SIMULATION, FEEDBACK CONTROL, FLIGHT CONTROL

**N84-23652\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EFFECT OF AERODYNAMIC AND ANGLE-OF-ATTACK UNCERTAINTIES ON THE BLENDED ENTRY FLIGHT CONTROL SYSTEM OF THE SPACE SHUTTLE FROM MACH 10 TO 2.5**

H. W. STONE and R. W. POWELL Apr. 1984 291 p (NASA-TP-2283; L-15719; NAS 1.60:2283) Avail: NTIS HC A13/MF A01 CSCL 01C

ANGLE OF ATTACK, COMPUTERIZED SIMULATION, DEGREES OF FREEDOM

**N84-25717\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AN ALGORITHM FOR MAXIMUM LIKELIHOOD ESTIMATION USING AN EFFICIENT METHOD FOR APPROXIMATING SENSITIVITIES**

P. C. MURPHY Jun. 1984 38 p refs (NASA-TP-2311; L-15735; NAS 1.60:2311) Avail: NTIS HC A03/MF A01 CSCL 01C

ALGORITHMS, APPROXIMATION, MAXIMUM LIKELIHOOD ESTIMATES, OPTIMIZATION, PARAMETER IDENTIFICATION, SENSITIVITY

**N84-28801\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SPACE SHUTTLE SEPARATE-SURFACE CONTROL-SYSTEM STUDY**

L. W. BROWN and R. C. MONTGOMERY Jul. 1984 59 p refs (NASA-TP-2340; L-15650; NAS 1.60:2340) Avail: NTIS HC A04/MF A01 CSCL 01C

AERODYNAMIC STABILITY, CONTROL DATA (COMPUTERS), CONTROL THEORY, FLIGHT CHARACTERISTICS, SPACECRAFT CONTROL, YAW

**N84-32394\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **MINIMUM-FUEL, 3-DIMENSIONAL FLIGHTPATH GUIDANCE OF TRANSFER JETS**

F. NEUMAN and E. KREINDLER (Technion Israel Inst. of Tech., Haifa) Sep. 1984 90 p refs (NASA-TP-2326; A-9533; NAS 1.60:2326) Avail: NTIS HC A05/MF A01 CSCL 01C

COMMERCIAL AIRCRAFT, FLIGHT PATHS, JET AIRCRAFT, TRANSPORT AIRCRAFT

**N85-11002\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SIMULATOR STUDY OF FLIGHT CHARACTERISTICS OF SEVERAL LARGE, DISSIMILAR, CARGO TRANSPORT AIRPLANES DURING APPROACH AND LANDING**

W. D. GRANTHAM, P. M. SMITH (Kentron International, Inc.), P. L. DEAL (Air Force Systems Command), and W. R. NEELY, JR. Nov. 1984 88 p refs (NASA-TP-2357; L-15805; NAS 1.60:2357) Avail: NTIS HC A05/MF A01 CSCL 01C

AERODYNAMIC CONFIGURATIONS, DATA CORRELATION, FLIGHT CHARACTERISTICS, FLIGHT SIMULATORS, TRANSPORT AIRCRAFT

**N85-23801\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **TOTAL ENERGY-RATE FEEDBACK FOR AUTOMATIC GLIDE-SLOPE TRACKING DURING WIND-SHEAR PENETRATION**

C. M. BELCASTRO and A. J. OSTROFF May 1984 73 p refs (NASA-TP-2412; L-15845; NAS 1.60:2412) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT LANDING, FEEDBACK, GLIDE PATHS, LONGITUDINAL CONTROL, OPTIMAL CONTROL, WIND SHEAR

**N85-28949\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PILOTTED SIMULATION OF AN ALGORITHM FOR ONBOARD CONTROL OF TIME-OPTIMAL INTERCEPT**

D. B. PRICE, A. J. CALISE (Drexel Univ.), and D. D. MOERDER (Information and Control Systems, Inc., Hampton, Va.) Jun. 1985 48 p refs (NASA-TP-2445; L-15896; NAS 1.60:2445) Avail: NTIS HC A03/MF A01 CSCL 01C

ALGORITHMS, COMPUTERIZED SIMULATION, FLIGHT CONTROL, ONBOARD DATA PROCESSING, TIME, TRAJECTORY OPTIMIZATION

**N85-34144\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **GROUND-BASED AND IN-FLIGHT SIMULATOR STUDIES OF FLIGHT CHARACTERISTICS OF A TWIN-FUSELAGE PASSENGER TRANSPORT AIRPLANE DURING APPROACH AND LANDING**

W. D. GRANTHAM, P. M. SMITH (PRC Kentron, Inc.), W. R. NEELY, JR. (AFSC Liaison Office, Hampton, Va.), P. L. DEAL, and K. R. YENNI Sep. 1985 55 p refs (NASA-TP-2451; L-15941; NAS 1.60:2451) Avail: NTIS HC A04/MF A01 CSCL 01C

APPROACH, CONTROLLABILITY, DEGREES OF FREEDOM, FLIGHT CHARACTERISTICS, FUSELAGES, LANDING, TRANSPORT AIRCRAFT

**N86-22579\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A METHODOLOGY FOR AIRPLANE PARAMETER ESTIMATION AND CONFIDENCE INTERVAL DETERMINATION IN NONLINEAR ESTIMATION PROBLEMS Ph.D. Thesis - George Washington Univ., Apr. 1985**

P. C. MURPHY Apr. 1986 56 p refs Revised (NASA-RP-1153; L-16009; NAS 1.61:1153) Avail: NTIS HC A04/MF A01 CSCL 01C

An algorithm for maximum likelihood (ML) estimation is developed with an efficient method for approximating the sensitivities. The ML algorithm relies on a new optimization method referred to as a modified Newton-Raphson with estimated sensitivities (MNRES). MNRES determines sensitivities by using slope information from local surface approximations of each output variable in parameter space. With the fitted surface, sensitivity information can be updated at each iteration with less computational effort than that required by either a finite-difference method or integration of the analytically determined sensitivity equations. MNRES eliminates the need to derive sensitivity equations for each new model, and thus provides flexibility to use model equations in any convenient format. A random search technique for determining the confidence limits of ML parameter estimates is applied to nonlinear estimation problems for airplanes. The confidence intervals obtained by the search are compared with Cramer-Rao (CR) bounds at the same confidence level. The degree of nonlinearity in the estimation problem is an important factor in the relationship between CR bounds and the error bounds determined by the search technique. Beale's measure of nonlinearity is developed in this study for airplane identification problems; it is used to empirically correct confidence levels and to predict the degree of agreement between CR bounds and search estimates.

Author

## 09 RESEARCH AND SUPPORT FACILITIES (AIR)

**N86-22580\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A TRANSPORT MODEL WITH AFT-FUSELAGE-MOUNTED ADVANCED TURBOPROPS**

Z. T. APPLIN and P. L. COE, JR. Apr. 1986 67 p refs  
(NASA-TP-2535; L-16004; NAS 1.60:2535) Avail: NTIS HC A04/MF A01 CSCL 01C

AERODYNAMIC CHARACTERISTICS, AERODYNAMIC STABILITY, CONTROL STABILITY, TRANSPORT AIRCRAFT

## 09

### RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands.

**N77-27139\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### HIGH REYNOLDS NUMBER RESEARCH

D. D. BAALS, ed. Washington 1977 185 p Workshop Proc. held at Hampton, Va., 27-28 Oct. 1976; sponsored in part by George Washington Univ.

(NASA-CP-2009) Avail: NTIS HC A09/MF A01 CSCL 02A

AERODYNAMICS, AEROELASTICITY, CONFERENCES, CRYOGENIC WIND TUNNELS, RESEARCH FACILITIES, REYNOLDS NUMBER, TRANSONIC WIND TUNNELS

**N79-16877\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### EXPERIMENTAL EVALUATION OF A PILOT MULTINOZZLE-DUCT APPARATUS

R. L. PUSTER Feb. 1979 46 p refs  
(NASA-TP-1319; L-12282) Avail: NTIS HC A03/MF A01 CSCL 14B

DUCTED BODIES, GASDYNAMIC LASERS, NOZZLE GEOMETRY

**N79-29199\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### A UNIQUE FACILITY FOR V/STOL AIRCRAFT HOVER TESTING

R. G. CULPEPPER, R. D. MURPHY (Naval Air Systems Command, Washington, D. C.), E. A. GILLESPIE (Rockwell Intern. Corp., Columbus, Ohio), and A. G. LANE Aug. 1979 56 p refs  
(NASA-TP-1473; L-12914) Avail: NTIS HC A04/MF A01 CSCL 14B

ANIONS, FLIGHT TESTS, HOVERING, RESEARCH FACILITIES, TETHERING, V/STOL AIRCRAFT

**N80-19131\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### A THEORETICAL ANALYSIS OF SIMULATED TRANSONIC BOUNDARY LAYERS IN CRYOGENIC-NITROGEN WIND TUNNELS

J. B. ADCOCK and C. B. JOHNSON Mar. 1980 40 p refs  
(NASA-TP-1631; L-13364) Avail: NTIS HC A03/MF A01 CSCL 14B

CRYOGENIC WIND TUNNELS, LAMINAR BOUNDARY LAYER, NITROGEN, TRANSONIC WIND TUNNELS, TURBULENT BOUNDARY LAYER

**N80-31413\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### DEVELOPMENT AND VALIDATION OF A HYBRID-COMPUTER SIMULATOR FOR A TRANSONIC CRYOGENIC WIND TUNNEL

J. J. THIBODEAUX and S. BALAKRISHNA (Old Dominion Univ.) Sep. 1980 84 p refs

(NASA-TP-1695; L-13691) Avail: NTIS HC A05/MF A01 CSCL 14B

COMPUTERIZED SIMULATION, CRYOGENIC WIND TUNNELS, TEST FACILITIES

**N81-32153\*#** National Aeronautics and Space Administration. Washington, D.C.

#### WIND TUNNELS OF NASA

D. D. BAALS and W. R. CORLISS 1981 162 p Original document contains color illustrations

(NASA-SP-440) Avail: NTIS HC A08/MF A01 CSCL 14B

The contribution of wind tunnels to aerodynamic studies is described. The development of the wind tunnel and the problems of calibration, scaling, and instrumentation are discussed. The NASA wind tunnels form the basis for the book, but Air Force, university, and industrial facilities are also considered. T.M.

**N82-11090\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### AN ALGORITHM FOR MINIMUM-COST SET-POINT ORDERING IN A CRYOGENIC WIND TUNNEL

J. S. TRIPP Nov. 1981 32 p refs  
(NASA-TP-1923; L-14695) Avail: NTIS HC A03/MF A01 CSCL 14B

ALGORITHMS, COST REDUCTION, CRYOGENIC COOLING, CRYOGENIC WIND TUNNELS, MATHEMATICAL MODELS, OPTIMAL CONTROL

**N83-17560\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

#### THE AERODYNAMIC PERFORMANCE OF SEVERAL FLOW CONTROL DEVICES FOR INTERNAL FLOW SYSTEMS

W. T. ECKERT (Army Aviation Research and Technology Labs.), B. M. WETTLAUER (Sverdrup Technology), and K. W. MORT Dec. 1982 49 p refs Sponsored in part by Army Aviation Research and Development Command

(NASA-TP-1972; A-8816; NAS 1.60:1972; AVRADCOM-TR-81-A-2) Avail: NTIS HC A03/MF A01 CSCL 14B

CASCADE FLOW, DUCTS, FLOW DISTRIBUTION, PRESSURE DISTRIBUTION, THROTTLING, WIND TUNNELS

**N83-18748\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### CRYOGENIC WIND TUNNEL MODELS. DESIGN AND FABRICATION

C. P. YOUNG, JR., comp. and B. B. GLOSS, comp. Mar. 1983 254 p refs Proc. of workshop held in Hampton, Va., 5-9 May 1982

(NASA-CP-2262; L-15567; NAS 1.55:2262) Avail: NTIS HC A12/MF A01 CSCL 14B

CONFERENCES, CRYOGENIC WIND TUNNELS, TRANSONIC WIND TUNNELS, WIND TUNNEL MODELS

**N83-18770\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### A METHOD FOR MODIFYING TWO-DIMENSIONAL ADAPTIVE WIND-TUNNEL WALLS INCLUDING ANALYTICAL AND EXPERIMENTAL VERIFICATION

J. L. EVERHART Feb. 1983 48 p refs  
(NASA-TP-2081; L-15491; NAS 1.60:2081) Avail: NTIS HC A03/MF A01 CSCL 14B

CAUCHY INTEGRAL FORMULA, CIRCULAR CYLINDERS, CONVERGENCE, WIND TUNNEL TESTS, WIND TUNNEL WALLS

## 09 RESEARCH AND SUPPORT FACILITIES (AIR)

**N83-36039\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EXPANDED OPERATIONAL CAPABILITIES OF THE LANGLEY MACH 7 SCRAMJET TEST FACILITY**  
S. R. THOMAS and R. W. GUY Oct. 1983 74 p refs  
(NASA-TP-2186; L-15565; NAS 1.60:2186) Avail: NTIS HC A04/MF A01 CSCL 14B

AIR FLOW, AIRFRAMES, NITROGEN OXIDES, SUPERSONIC COMBUSTION RAMJET ENGINES, TEMPERATURE PROFILES, TEST FACILITIES

**N85-18991\*#** National Aeronautics and Space Administration, Washington, D.C.  
**AERONAUTICAL FACILITIES CATALOGUE. VOLUME 1: WIND TUNNELS**

F. E. PENARANDA, comp. and M. S. FRED A, comp. Jan. 1985 421 p 2 Vol.  
(NASA-RP-1132; NAS 1.61:1132) Avail: NTIS HC A18/MF A01 CSCL 14B

Domestic and foreign wind tunnel facilities are enumerated and their technical parameters are described. Data pertinent to managers and engineers are presented. Facilities judged comparable in testing capability are noted and grouped together. Several comprehensive cross-indexes and charts are included.

R.S.F.

**N86-18328\*#** National Aeronautics and Space Administration, Washington, D.C.

**AERONAUTICAL FACILITIES CATALOGUE. VOLUME 2: AIRBREATHING PROPULSION AND FLIGHT SIMULATORS**

F. E. PENARANDA and M. S. FRED A, comp. Dec. 1985 242 p 2 Vol.  
(NASA-RP-1133; NAS 1.61:1133) Avail: NTIS HC A11/MF A01 CSCL 14B

Volume two of the facilities catalogue deals with Airbreathing Propulsion and Flight Simulation Facilities. Data pertinent to managers and engineers are presented. Each facility is described on a data sheet that shows the facility's technical parameters on a chart and more detailed information in narratives. Facilities judged comparable in testing capability are noted and grouped together. Several comprehensive cross-indexes and charts are included.

Author

**N86-24709\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DYNAMIC MEASUREMENT OF TOTAL TEMPERATURE, PRESSURE AND VELOCITY IN THE LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL**

C. B. JOHNSON and P. C. STAINBACK May 1986 45 p refs  
(NASA-TP-2584; L-16099; NAS 1.60:2584) Avail: NTIS HC A03/MF A01 CSCL 14B

CRYOGENIC WIND TUNNELS, LIQUID NITROGEN, PRESSURE MEASUREMENT, TEMPERATURE MEASUREMENT, VELOCITY MEASUREMENT

**N86-28101\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL EVALUATION OF TWO TURNING VANE DESIGNS FOR HIGH-SPEED CORNER OF 0.1-SCALE MODEL OF NASA LEWIS RESEARCH CENTER'S PROPOSED ALTITUDE WIND TUNNEL**

R. D. MOORE, D. R. BOLDMAN, and R. J. SHYNE Apr. 1986 130 p  
(NASA-TP-2570; E-2831; NAS 1.60:2570) Avail: NTIS HC A07/MF A01 CSCL 14B

AIRFOILS, ALTITUDE TESTS, CASCADE FLOW, EVALUATION, EXPERIMENTATION, VANES, WIND TUNNEL TESTS

12

## ASTRONAUTICS (GENERAL)

**N77-21106\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SPACE SETTLEMENTS: A DESIGN STUDY**

R. D. JOHNSON, ed. and C. HOLBROW, ed. (Colgate Univ.) Washington 1977 191 p refs Sponsored in part by Am. Soc. for Eng. Original contains color illustrations  
(NASA-SP-413; LC-76-600068) Avail: SOD HC \$5.00 CSCL 22A

Nineteen professors of engineering, physical science, social science, and architecture, three volunteers, six students, a technical director, and two co-directors worked for ten weeks to construct a convincing picture of how people might permanently sustain life in space on a large scale, and to design a system for the colonization of space. Because the idea of colonizing space has awakened strong public interest, the document presented is written to be understood by the educated public and specialists in other fields. It also includes considerable background material. A table of units and conversion factors is included to aid the reader in interpreting the units of the metric system used in the report.

Author

**N77-27155\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SKYLAB, OUR FIRST SPACE STATION**

L. F. BELEW, ed. Washington 1977 176 p  
(NASA-SP-400) Avail: NTIS MF A01; SOD HC \$7.00 CSCL 22A

The vast accomplishments of Skylab - in solar and stellar astronomy, in the detailed study of our planet from the incomparable vantage of orbit, in using the laboratory tool of weightlessness, and in proving that man can work productively in space for extended periods - are discussed. The data on solar physics contain valuable information on the Sun's corona and the solar winds and open up new concepts to be explored in future solar astronomy programs. In the area of technology, the data from Skylab's space processing experiments open a completely new dimension in the field of materials processing.

Author

**N78-17088\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**APOLLO-SOYUZ TEST PROJECT. VOLUME 1: ASTRONOMY, EARTH ATMOSPHERE AND GRAVITY FIELD, LIFE SCIENCES, AND MATERIALS PROCESSING**

1977 570 p refs 2 Vol.  
(NASA-SP-412) Avail: NTIS HC A24/MF A01 CSCL 22A

The joint U.S.-USSR experiments and the U.S. conducted unilateral experiments performed during the Apollo Soyuz Test Project are described. Scientific concepts and experiment design and operation are discussed along with scientific results of postflight analysis. For individual titles, see N78-17089 through N78-17119.

**N78-18088\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**AIAA/MSFC SYMPOSIUM ON SPACE INDUSTRIALIZATION: PROCEEDINGS**

1976 627 p refs Proc. held at Huntsville, Ala., 26-27 May 1976

(NASA-CP-2026) Avail: NTIS HC A99/MF A01 CSCL 22A

CONFERENCES, SATELLITE SOLAR POWER STATIONS, SPACE MANUFACTURING, SPACE PROCESSING, SPACE STATIONS, SPACE TRANSPORTATION



**N78-20151\*#** National Aeronautics and Space Administration, Washington, D.C.

**ON THE SHOULDERS OF TITANS: A HISTORY OF PROJECT GEMINI**

B. C. HACKER 1977 634 p refs Original contains color illustrations  
(NASA-SP-4203) Avail: NTIS MF A01; SOD HC \$8.25 CSCL 22A

Gemini was the intermediate manned space flight program between America's first steps into space with Mercury and the manned lunar expeditions of Apollo. Because of its position between these two other efforts, Gemini is probably less remembered. Still, it more than had its place in man's progress into this new frontier. Gemini accomplishments were manifold. They included many firsts: first astronaut-controlled maneuvering in space; first rendezvous in space of one spacecraft with another; first docking of one spacecraft with a propulsive stage and use of that stage to transfer man to high altitude; first traverse of man into the earth's radiation belts; first extended manned flights of a week or more in duration; first extended stays of man outside his spacecraft; first controlled reentry and precision landing; and many more. These achievements were significant in ways one cannot truly evaluate even today, but two things stand out: (1) it was the time when America caught up and surpassed the Soviet Union in manned space flight, and (2) these demonstrations of capability were an absolute prerequisite to the phenomenal Apollo accomplishments then yet to come. Author

**N78-21174\*#** National Aeronautics and Space Administration, Washington, D.C.

**APOLLO OVER THE MOON: A VIEW FROM ORBIT**

H. MASURSKY, ed., G. W. COLTON, ed., F. EL-BAZ, ed., F. J. DOYLE, R. E. EGGLETON, M. J. GROlier, J. W. HEAD, III, C. A. HODGES, K. A. HOWARD, L. J. KOSOFKY et al. 1978 263 p refs Original contains color illustrations  
(NASA-SP-362; LC-77-25922) Avail: NTIS MF A01; SOD HC \$9.25 CSCL 03B

The Apollo metric camera system was flown to acquire photographic data with accuracy to aid the effort of moon mapping. The panoramic camera was selected to provide high resolution photography of lunar surface features for detailed analysis and photointerpretation. A portion of these photographs is presented. Various views and subjects include the following: (1) Regional views; (2) The Terraes; (3) The Maria; (4) Craters; (5) Sinuous and Straight Rimae; and (6) Unusual features. Author

**N78-25115\*#** National Aeronautics and Space Administration, Washington, D.C.

**SKYLAB: A CHRONOLOGY**

R. W. NEWKIRK, I. D. ERTEL, and C. G. BROOKS 1977 476 p refs  
(NASA-SP-4011; LC-77-608101) Avail: NTIS MF A01; SOD HC \$7.00 CSCL 22A

The Skylab Program was specifically designed to conduct a series of experiments from beyond the earth's atmosphere. Since the number and types of experiments conducted during the operational phase of Skylab were constantly changing, rather than encumber the body of the chronology with these changes, a lengthy appendix on experiments is included in this document. This appendix identifies the principle investigators and coinvestigators; gives the types, numbers, and descriptions of the experiments; explains the purpose of the various experiments; and, where possible, gives the results or findings of the experiments. The body of the Skylab chronology is divided into three parts; early space station activities, Apollo applications, and Skylab development and operations. Author

**N78-27146\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**THE VOYAGE OF MARINER 10: MISSIONS TO VENUS AND MERCURY**

J. A. DUNNE and E. BURGESS 1978 233 p refs Original contains color illustrations  
(NASA-SP-424; LC-77-18956) Avail: NTIS MF A01; SOD HC \$12.25 CSCL 22A

The historical details of the Mariner 10 mission are recorded. Provided is a selection of some of the images obtained by the spacecraft at both Venus and Mercury. The solar sailing method greatly reduced the spacecraft's gas usage thus permitting two returns to Mercury. These revisits provided additional pictures of the planet's south pole and confirmed the existence of Mercury's magnetic field. G.G.

**N78-76855\*** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**FLIGHT MECHANICS/ESTIMATION THEORY SYMPOSIUM**

A. FUCHS 1975 265 p refs Symp. held at Greenbelt, Md., 29-30 1975  
(NASA-CP-2002) Avail: Goddard Space Flight Center, Code 582

CONFERENCES, FLIGHT MECHANICS, ORBIT CALCULATION, ORBITAL POSITION ESTIMATION

**N79-10074\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE PARTNERSHIP: A HISTORY OF THE APOLLO-SOYUZ TEST PROJECT**

E. C. EZELL and L. N. EZELL 1978 570 p refs Original contains color illustrations  
(NASA-SP-4209) Avail: NTIS SOD HC CSCL 22A

Correspondance, interviews, official documents, and other published materials were used to trace the evolution of the Apollo Soyuz Test Project from the initial proposal for international cooperation in space use and exploration until the successful completion of the joint Soviet-American mission. Conceptual drawings of proposed docking modules and mechanisms are presented and discussed. Black and white photographs taken during mission planning and in-flight activities are included with color photographs of the earth taken during the mission. Joint meetings are summarized and the scientific experiments and launch vehicles are discussed in the appendices. A.H.

**N79-13069\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**PROCEEDINGS OF THE WORKSHOP ON AN ELECTROMAGNETIC POSITIONING SYSTEM IN SPACE**

W. A. ORAN, ed. Oct. 1978 25 p refs Workshop held at Washington, D. C., 1-2 May 1978  
(NASA-CP-2069) Avail: NTIS HC A02/MF A01 CSCL 22A

AEROSPACE TECHNOLOGY TRANSFER, CONFERENCES, ELECTROMAGNETIC PULSES, POSITION (LOCATION)

**N79-19013\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**NINTH CONFERENCE ON SPACE SIMULATION**

1977 470 p refs Conf. held at Los Angeles, 26-28 Apr. 1977; sponsored in part by Inst. of Environ. Sci., AIAA, and Am. Soc. for Testing and Mater.  
(NASA-CP-2007) Avail: NTIS HC A20/MF A01 CSCL 22A

CONFERENCES, SPACE ENVIRONMENT SIMULATION, SPACE SIMULATORS

## 12 ASTRONAUTICS (GENERAL)

**N79-20162\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **GOVERNMENT/INDUSTRY WORKSHOP ON PAYLOAD LOADS TECHNOLOGY**

1978 874 p refs Workshop held at Huntsville, Ala., 14-16 Nov. 1978

(NASA-CP-2075) Avail: NTIS HC A99/MF A01 CSCL 22A  
CONFERENCES, PAYLOADS, SPACE SHUTTLES, TECHNOLOGY ASSESSMENT

**N79-25048\*#** Air Force Materials Lab., Wright-Patterson AFB, Ohio.

### **PROCEEDINGS OF THE USAF/NASA INTERNATIONAL SPACECRAFT CONTAMINATION CONFERENCE Scientific Interim Report, 7-9 Mar. 1978**

J. M. JEMIOLA, ed. 1978 1219 p refs Conf. held at AF Acad., Colo., 7-9 Mar. 1978; cosponsored by NASA and AF (AF PROJ. 7340)

(NASA-CP-2039; AFML-TR-78-190) Avail: NTIS HC A99/MF A01 CSCL 22A

CONFERENCES, SPACECRAFT CONTAMINATION, SPACECRAFT ENVIRONMENTS

**N79-26076\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **PROCEEDINGS OF WORKSHOPS TO DEFINE ENGINEERING REQUIREMENTS FOR A SPACE VACUUM RESEARCH FACILITY**

W. A. ORAN, ed., S. T. WU, ed. (Alabama Univ. in Huntsville), and R. W. HOFFMAN, ed. (Case Western Reserve Univ., Ohio) Jun. 1979 152 p refs Workshops held at Huntsville, Ala., 12-13 Jun. 1978 and 3-4 Apr. 1978

(NASA-CP-2091) Avail: NTIS HC A08/MF A01 CSCL 22A

CONFERENCES, RESEARCH FACILITIES, SPACECRAFT ENVIRONMENTS, SPACECRAFT SHIELDING, SYSTEMS ENGINEERING, ULTRAHIGH VACUUM

**N79-28203\*#** National Aeronautics and Space Administration, Washington, D.C.

### **CHARIOTS FOR APOLLO: A HISTORY OF MANNED LUNAR SPACECRAFT**

C. G. BROOKS, J. M. GRIMWOOD, and L. S. SWENSON, JR. 1979 553 p refs

(NASA-SP-4205) Avail: NTIS MF A01; SOD HC \$9.00 CSCL 22B

Beginning with the challenges presented by Sputnik 1 in 1957, and the formation of NASA, the Apollo lunar exploration program is reviewed through Apollo Flight 11. The focal points are the spacecraft including the command and service modules, and the lunar module. F.O.S.

**N79-32225\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **SPACE RESOURCES AND SPACE SETTLEMENTS**

J. BILLINGHAM, ed., W. P. GILBREATH, ed., B. OLEARY, ed. (Princeton Univ.), and B. GOSSET, ed. Washington 1979 292 p Derived from 1977 Ames Summer Study, Moffett Field, Calif. Original contains color illustrations

(NASA-SP-428) Avail: NTIS MF A01; SOD HC CSCL 22B

The technical papers from the five task groups that took part in the 1977 Ames Summer Study on Space Settlements and Industrialization Using Nonterrestrial Materials are presented. The papers are presented under the following general topics: (1) research needs for regenerative life-support systems; (2) habitat design; (3) dynamics and design of electromagnetic mass drivers; (4) asteroids as resources for space manufacturing; and (5) processing of nonterrestrial materials. For individual titles, see N79-32226 through N79-32241.

**N81-16075\*#** National Aeronautics and Space Administration, Washington, D.C.

### **MATERIALS PROCESSING IN SPACE: EARLY EXPERIMENTS**

R. J. NAUMANN and H. W. HERRING 1980 123 p Original contains color illustrations

(NASA-SP-443; LC-80-607081) Avail: NTIS MF A01; SOD HC \$10.00 CSCL 22A

The characteristics of the space environment were reviewed. Potential applications of space processing are discussed and include metallurgical processing, and processing of semiconductor materials. The behavior of fluid in low gravity is described. The evolution of apparatus for materials processing in space was reviewed. T.M.

**N81-19144\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **FLOAT ZONE WORKSHOP**

R. J. NAUMANN Dec. 1980 175 p refs Workshop held in Huntsville, Ala., 12 Dec. 1980

(NASA-CP-2179) Avail: NTIS HC A08/MF A01 CSCL 22A

CRYSTAL GROWTH, INTERFACIAL TENSION, LOW GRAVITY MANUFACTURING, SPACE PROCESSING

**N81-26160\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EVA ASSEMBLY OF LARGE SPACE STRUCTURE ELEMENT**

L. J. BEMENT, H. G. BUSH, W. L. HEARD, JR., and J. W. STOKES, JR. (NASA, Marshall Space Flight Center) Jun. 1981 38 p refs

(NASA-TP-1872; L-14353) Avail: NTIS HC A03/MF A01 CSCL 22A

EXTRAVEHICULAR ACTIVITY, LARGE SPACE STRUCTURES, ORBITAL ASSEMBLY, SPACE ENVIRONMENT SIMULATION, SPACE ERECTABLE STRUCTURES

**N82-10064\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **SIXTH ANNUAL FLIGHT MECHANICS/ESTIMATION THEORY SYMPOSIUM**

E. LEFFERTS, ed. Oct. 1981 287 p refs Conf. held at Greenbelt, Md., 27-28 Oct. 1981

(NASA-CP-2205) Avail: NTIS HC A13/MF A01 CSCL 22A

CONFERENCES, FLIGHT MECHANICS, ORBITAL MECHANICS, ORBITAL POSITION ESTIMATION, SPACECRAFT ORBITS

**N82-26330\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **FLOAT ZONE WORKSHOP**

E. L. KERN, ed. and E. K. COTHRAN, ed. Sep. 1981 205 p refs Workshop held at Huntsville, Ala., 22-23 Sep. 1981

(NASA-CP-2226; NAS 1.55:2226) Avail: NTIS HC A10/MF A01 CSCL 22A

CONFERENCES, CRYSTAL GROWTH, MELTS (CRYSTAL GROWTH), SPACE PROCESSING, ZONE MELTING

**N82-29335\*#** National Aeronautics and Space Administration, Washington, D.C.

### **APPROXIMATE ANALYSIS OF THERMAL CONVECTION IN A CRYSTAL-GROWTH CELL FOR SPACELAB 3**

R. F. DRESSLER Jun. 1982 11 p refs

(NASA-TP-2016; EN-1; NAS 1.60:2016) Avail: NTIS HC A02/MF A01 CSCL 20B

CRYSTAL GROWTH, FREE CONVECTION, SPACE PROCESSING, SPACELAB PAYLOADS

**N84-25737\*#** National Aeronautics and Space Administration, Washington, D.C.

**LIVING AND WORKING IN SPACE. A HISTORY OF SKYLAB**  
W. D. COMPTON and C. D. BENSON 1983 466 p refs  
Original document contains color illustrations  
(NASA-SP-4208; NAS 1.21:4208; LC-81-22424) Avail: NTIS MF A01; SOD HC \$20.00 as 033-000-00847-3

The history of Skylab is examined with emphasis on program development from previous Apollo missions, modifications to spacecraft, onboard experiments, and flight crew training. A listing of the missions and an evaluation of results are included with a brief description of the workshop's reentry. M.A.C.

**N84-27758\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**GET AWAY SPECIAL EXPERIMENTER'S SYMPOSIUM**  
C. R. PROUTY, ed. Jul. 1984 162 p refs  
(NASA-CP-2324; NAS 1.55:2324) Avail: NTIS HC A08/MF A01 CSCL 22A

CONFERENCES, GET AWAY SPECIALS (STS), PAYLOADS, SPACE SHUTTLES, SPACEBORNE EXPERIMENTS, STRUCTURAL DESIGN

**N85-11011\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**SECOND SYMPOSIUM ON SPACE INDUSTRIALIZATION**  
C. M. JERNIGAN, ed. Oct. 1984 427 p refs Symp. held in Huntsville, Ala., 13-15 Feb. 1984 Sponsored in cooperation with AIAA and Alabama Univ.  
(NASA-CP-2313; M-464; NAS 1.55:2313) Avail: NTIS HC A19/MF A01 CSCL 22A

BIOPROCESSING, COMMUNICATION, CONFERENCES, ECONOMIC FACTORS, GOVERNMENT/INDUSTRY RELATIONS, LAUNCH VEHICLES, LAW (JURISPRUDENCE), POLICIES, REDUCED GRAVITY, REMOTE SENSING, SPACE COMMERCIALIZATION, SPACE INDUSTRIALIZATION, SPACE PROCESSING, SPACE STATIONS

**N85-16889\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

**SPACE SHUTTLE TECHNICAL CONFERENCE, PART 1**  
N. CHAFFEE, comp. Washington Jan. 1985 598 p refs  
Conf. held in Houston, Tex., 28-30 Jun. 1983 2 Vol.  
(NASA-CP-2342-PT-1; S-539-PT-1; NAS 1.55:2342-PT-1) Avail: NTIS HC A25/MF A01 CSCL 22A

SPACE SHUTTLE ORBITERS, SPACE SHUTTLES, SPACECRAFT DESIGN

**N85-16937\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

**SPACE SHUTTLE TECHNICAL CONFERENCE, PART 2**  
N. CHAFFEE, comp. Jan. 1985 530 p refs  
Conf. held in Houston, Tex., 28-30 Jun. 1983 2 Vol.  
(NASA-CP-2342-PT-2; S-539; NAS 1.55:2342-PT-2) Avail: NTIS HC A23/MF A01 CSCL 22A

AVIONICS, COMMUNICATION, CONFERENCES, FLIGHT CONTROL, NAVIGATION, PROPULSION SYSTEM PERFORMANCE, SPACE SHUTTLES, SPACECRAFT STRUCTURES, THERMAL PROTECTION

**N85-21188\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

**ORBITAL DEBRIS**  
D. J. KESSLER, comp. and S. Y. SU, comp. (Lockheed-EMSCO, Houston, Tex.) Mar. 1985 453 p refs  
Proc. of a Workshop held in Houston, Tex., 27-29 Jul. 1982  
(NASA-CP-2360; S-532; NAS 1.55:2360) Avail: NTIS HC A20/MF A01 CSCL 22A

COLLISIONS, CONFERENCES, HYPERVELOCITY IMPACT, IMPACT DAMAGE, ORBIT DECAY, ORBIT TRANSFER VEHICLES, ORBITAL MECHANICS, ORBITAL SERVICING, SATELLITE TRACKING, SPACE DEBRIS

**N85-33126\*#** Texas A&M Univ., College Station.

**FAR TRAVELERS: THE EXPLORING MACHINES**

O. W. NICKS Jun. 1985 269 p Original contains color illustrations  
(NASW-3557)

(NASA-SP-480; NAS 1.21:480; LC-85-1794) Avail: NTIS MF A01; SOD HC \$17.00 as 033-000-00957-7 CSCL 22A

During the first two decades of space activities, unmanned spacecraft played a vital role in the initial exploration of the Moon and the planets. The spacecraft employed emerging technologies to provide extensions of man in the close-up viewing and measurement of the environment and features of Earth's interplanetary neighbors. An account of early experiences in the development and use of interplanetary vehicles is presented. Specific lunar and planetary missions (e.g., Ranger, Mariner, and Viking) are discussed. In addition, incidents highlighting the evolution of significant technologies are presented, based on personal views of people intimately involved in the efforts.

Author

**N86-21559\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**GRAPHICAL TECHNIQUES TO ASSIST IN POINTING AND CONTROL STUDIES OF ORBITING SPACECRAFT**  
L. W. HOWELL and J. H. RUF Mar. 1986 20 p  
(NASA-TP-2575; NAS 1.60:2575) Avail: NTIS HC A02/MF A01 CSCL 22A

COMPUTER GRAPHICS, CONTROL SYSTEMS DESIGN, HUBBLE SPACE TELESCOPE, POINTING CONTROL SYSTEMS

**N86-27297\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**THE 1985 GET AWAY SPECIAL EXPERIMENTER'S SYMPOSIUM**  
L. R. THOMAS, ed. and F. L. MOSIER, ed. May 1986 295 p  
Symposium held in Greenbelt, Md., 8-9 Oct. 1985  
(NASA-CP-2401; REPT-86B0015; NAS 1.55:2401) Avail: NTIS HC A13/MF A01 CSCL 22A

EXPLORER SATELLITES, GET AWAY SPECIALS (STS), REDUCED GRAVITY, SPACE MANUFACTURING, SPACE SHUTTLE PAYLOADS, SPACE SHUTTLES

**N86-28104\*#** National Aeronautics and Space Administration, Washington, D.C.

**TECHNOLOGY FOR LARGE SPACE SYSTEMS: A BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 14)**  
Jul. 1986 172 p  
(NASA-SP-7046(14); NAS 1.21:7046(14)) Avail: NTIS HC A07 CSCL 22A

This bibliography lists 645 reports, articles and other documents introduced into the NASA scientific and technical information system between July 1, 1985 and December 31, 1985. Its purpose is to provide helpful information to the researcher, manager, and designer in technology development and mission design according to system, interactive analysis and design, structural and thermal analysis and design, structural concepts and control systems, electronics, advanced materials, assembly concepts, propulsion, and solar power satellite systems. Author

**N86-28105\*#** National Aeronautics and Space Administration, Washington, D.C.

**SPACE STATION SYSTEMS: A BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 2)**  
Jul. 1986 232 p  
(NASA-SP-7056(02); NAS 1.21:7056(02)) Avail: NTIS HC A10 CSCL 22A

This bibliography lists 904 reports, articles and other documents introduced into the NASA scientific and technical information system between July 1, 1985 and December 31, 1985. Its purpose is to provide helpful information to the researcher, manager, and designer in technology development and mission design according to system, interactive analysis and design, structural and thermal analysis and design, structural concepts and control systems,

## 13 ASTRODYNAMICS

electronics, advanced materials, assembly concepts, propulsion, and solar power satellite systems. The coverage includes documents that define major systems and subsystems, servicing and support requirements, procedures and operations, and missions for the current and future space station. Author

### 13

#### ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbital and launching dynamics.

**N78-12113\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

##### **AN INTRODUCTION TO ORBIT DYNAMICS AND ITS APPLICATION TO SATELLITE-BASED EARTH MONITORING SYSTEMS**

D. R. BROOKS Nov. 1977 85 p refs  
(NASA-RP-1009; L-11710) Avail: NTIS HC A05/MF A01  
CSCL 22A

The long term behavior of satellites is studied at a level of complexity suitable for the initial planning phases of earth monitoring missions. First-order perturbation theory is used to describe in detail the basic orbit dynamics of satellite motion around the earth and relative to the sun. Surface coverage capabilities of satellite orbits are examined. Several examples of simulated observation and monitoring missions are given to illustrate representative applications of the theory. The examples stress the need for devising ways of maximizing total mission output in order to make the best possible use of the resultant data base as input to those large-scale, long-term earth monitoring activities which can best justify the use of satellite systems. Author

**N79-14121\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

##### **FLIGHT MECHANICS/ESTIMATION THEORY SYMPOSIUM**

May 1978 289 p refs Symp. held at Greenbelt, Md., 18-19 Oct. 1977

(NASA-CP-2050) Avail: NTIS HC A13/MF A01 CSCL 22A

CONFERENCES, ORBITAL MECHANICS, ORBITAL POSITION ESTIMATION, SATELLITE ATTITUDE CONTROL, SATELLITE ORBITS

**N79-26082\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

##### **FLIGHT MECHANICS/ESTIMATION THEORY SYMPOSIUM**

A. J. FUCHS, ed. Apr. 1979 347 p refs Symp. held at Greenbelt, Md., 18-19 Oct. 1978

(NASA-CP-2082; G-7813) Avail: NTIS HC A15/MF A01 CSCL 22A

CONFERENCES, FLIGHT MECHANICS, ORBITAL MECHANICS, ORBITAL POSITION ESTIMATION, SATELLITE ORBITS, SPACE NAVIGATION

**N80-13135\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

##### **TWO-IMPULSE REORIENTATION OF ASYMMETRIC SPACECRAFT**

C. W. MARTZ Washington Dec. 1979 43 p refs  
(NASA-TP-1554; L-12921) Avail: NTIS HC A03/MF A01  
CSCL 22A

COST ANALYSIS, SATELLITE ATTITUDE CONTROL, SPACECRAFT MANEUVERS, SPIN STABILIZATION

**N80-19142\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

##### **ORBIT DYNAMICS AND GEOGRAPHICAL COVERAGE CAPABILITIES OF SATELLITE-BASED SOLAR OCCULTATION EXPERIMENTS FOR GLOBAL MONITORING OF STRATOSPHERIC CONSTITUENTS**

D. R. BROOKS Mar. 1980 76 p  
(NASA-TP-1606; L-12804) Avail: NTIS HC A05/MF A01  
CSCL 03B

ATMOSPHERIC COMPOSITION, REMOTE SENSORS, SATELLITE ORBITS, SOLAR ECLIPSES, STRATOSPHERE

**N80-28389\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

##### **FLIGHT MECHANICS/ESTIMATION THEORY SYMPOSIUM**

A. J. FUCHS, ed. Washington 1980 260 p refs Symp. held at Greenbelt, Md., 17-18 Oct. 1979

(NASA-CP-2123) Avail: NTIS HC A12/MF A01 CSCL 22A

CONFERENCES, ORBIT CALCULATION, ORBITAL MECHANICS, ORBITAL POSITION ESTIMATION, SATELLITE ORBITS

**N81-11070\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

##### **FIFTH ANNUAL FLIGHT MECHANICS/ESTIMATION THEORY SYMPOSIUM**

J. TELES, ed. Oct. 1980 464 p refs Symp. held in Greenbelt, Md., 21-22 Oct. 1980

(NASA-CP-2152) Avail: NTIS HC A20/MF A01 CSCL 22A

ASTRODYNAMICS, CONFERENCES, GODDARD TRAJECTORY DETERMINATION SYSTEM, ORBIT CALCULATION, SATELLITE ORBITS

### 14

#### GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

**N79-12127\*#** National Aeronautics and Space Administration. Washington, D.C.

##### **MOONPORT: A HISTORY OF APOLLO LAUNCH FACILITIES AND OPERATIONS**

C. D. BENSON and W. B. FAHERTY 1978 643 p refs  
(NASA-SP-4204) Avail: NTIS MF A01; SOD HC CSCL 22D

The development of the Apollo launch facilities and launch operations is described from the beginning of design through the final launch. Management techniques, innovation in automation, and testing on the ground to avoid failures in space are among the topics covered. The impact of the Apollo program on the citrus groves and quiet beaches of Florida's east coast is included. J.M.S.

**N79-20166\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

##### **A NEW DIMENSION. WALLOPS ISLAND FLIGHT TEST RANGE: THE FIRST FIFTEEN YEARS**

J. A. SHORTAL Dec. 1978 784 p refs  
(NAS6-1364)

(NASA-RP-1028) Avail: NTIS HC A99/MF A01 CSCL 14B

A record of the first fifteen years (1945-1959) of research and development tests that were performed at Wallops Island is presented. It begins with the events that led to the establishment of the National Advisory Committee for Aeronautics flight test range on Wallops Island to the first year as a part of the National Aeronautics and Space Administration. F.O.S.

## 15 LAUNCH VEHICLES AND SPACE VEHICLES

**N82-15095\*#** Computer Technology Associates, Inc., Arlington, Va.

### **OFFICE OF SPACE TERRESTRIAL APPLICATIONS (OSTA)/APPLICATIONS DATA SERVICE (ADS) DATA SYSTEMS STANDARDS**

B. A. WALTON, ed. Washington Dec. 1981 270 p refs  
Proceedings of Workshop held at Greenbelt, Md., 27-29 May 1981

(NASA-CP-2196) Avail: NTIS HC A12/MF A01 CSCL 14B  
CONFERENCES, DATA BASES, FILE MAINTENANCE (COMPUTERS), STANDARDS, USER MANUALS (COMPUTER PROGRAMS), USER REQUIREMENTS

## 15

### **LAUNCH VEHICLES AND SPACE VEHICLES**

Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles.

**N77-29189\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

#### **SKYLAB, CLASSROOM IN SPACE**

L. B. SUMMERLIN, ed. Washington 1977 190 p Original contains color illustrations

(NASA-SP-401; LC-76-30715) Avail: NTIS MF A01; HC SOD CSCL 22A

Student-designed Skylab experiments are described and the results reported. Demonstrations performed on Skylab to show the effect of weightlessness are described. Author

**N78-10186\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### **PARAMETRIC STUDY OF ASCENT PERFORMANCE OF A VERTICALLY LAUNCHED HYDROGEN-FUELED SINGLE-STAGE REUSABLE TRANSPORT**

J. J. REHDER 1977 41 p refs

(NASA-TP-1045) Avail: NTIS HC A03/MF A01 CSCL 22A

CLIMBING FLIGHT, LAUNCH VEHICLES, PROPULSION SYSTEM PERFORMANCE, ROCKET THRUST

**N78-13109\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### **EFFECT OF PROPULSION SYSTEM CHARACTERISTICS ON ASCENT PERFORMANCE OF DUAL-FUELED SINGLE-STAGE EARTH-TO-ORBIT TRANSPORTS**

J. J. REHDER Dec. 1977 65 p refs

(NASA-TP-1115; L-11933) Avail: NTIS HC A04/MF A01 CSCL 21H

ASCENT PROPULSION SYSTEMS, LAUNCH VEHICLES, PROPULSION SYSTEM CONFIGURATIONS, SPACECRAFT PERFORMANCE

**N78-15142\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

#### **SIGNIFICANT INITIAL RESULTS FROM THE ENVIRONMENTAL MEASUREMENTS EXPERIMENT ON ATS-6**

T. A. FRITZ (NOAA, Boulder, Colo.), C. W. ARTHUR (California Univ., Los Angeles), J. B. BLAKE (Aerospace Corp., Los Angeles), P. J. COLEMAN, JR. (California Univ., Los Angeles), J. P. CORRIGAN (NASA, Goddard Space Flight Center), W. D. CUMMINGS (Grambling State Univ., La.), S. E. DEFOREST (Alabama Univ., Huntsville), K. N. ERICKSON (Minnesota Univ., Minneapolis), A. KONRADI (NASA, Johnson Space Center), W. LENNARTSSON (NASA, Marshall Space Flight Center) et al. Dec. 1977 34 p refs

(NASA-TP-1101; G-7702-F15) Avail: NTIS HC A03/MF A01 CSCL 22A

ATS 6, ELECTRON DISTRIBUTION, ENVIRONMENTAL

MONITORING, INTERPLANETARY MAGNETIC FIELDS, ION DISTRIBUTION, RADIATION MEASUREMENT

**N78-15143\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

#### **AN ACTIVE NUTATION DAMPER FOR SPACECRAFT**

R. A. ABERCROMBIE and T. W. FLATLEY Dec. 1977 24 p  
(NASA-TP-1108; G-7702-F23) Avail: NTIS HC A02/MF A01 CSCL 22B

ACCELEROMETERS, NUTATION, NUTATION DAMPERS, SPACECRAFT CONTROL

**N78-15149\*#** National Aeronautics and Space Administration, Washington, D.C.

#### **LUNAR IMPACT: A HISTORY OF PROJECT RANGER**

R. C. HALL 1977 467 p refs

(NASA-SP-4210) Avail: NTIS MF A01; HC SOD \$6.25 CSCL 22A

Complete history of the Ranger project is provided as a tool for understanding the evolution and operational form of NASA's continuing progress of unmanned space exploration. Basic management techniques, flight operating procedures and technology for NASA's later unmanned lunar and planetary missions were reviewed. Methods for selecting experiments and integrating them with the spacecraft were also investigated. Author

**N78-17127\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

#### **PURGING OF A TANK-MOUNTED MULTILAYER INSULATION SYSTEM BY GAS DIFFUSION**

I. E. SUMNER Jan. 1978 59 p refs

(NASA-TP-1127; E-9286) Avail: NTIS HC A04/MF A01 CSCL 22B

CRYOGENIC FLUID STORAGE, GASEOUS DIFFUSION, HELIUM, MULTILAYER INSULATION, PROPELLANT TANKS, PURGING

**N78-21193\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

#### **THEORETICAL CONTAMINATION OF CRYOGENIC SATELLITE TELESCOPES**

M. MURAKAMI (Tokyo Univ., Japan) Apr. 1978 49 p refs

(NASA-TP-1177; A-7024) Avail: NTIS HC A03/MF A01 CSCL 22A

CRYOGENIC EQUIPMENT, SPACECRAFT CONTAMINATION, TELESCOPES

**N78-28150\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

#### **THERMAL PERFORMANCE OF GASEOUS-HELIUM-PURGED TANK-MOUNTED MULTILAYER INSULATION SYSTEM DURING GROUND-HOLD AND SPACE-HOLD THERMAL CYCLING AND EXPOSURE TO WATER VAPOR**

I. E. SUMNER Aug. 1978 74 p

(NASA-TP-1114; E-9443) Avail: NTIS HC A04/MF A01 CSCL 22B

HELIUM, MULTILAYER INSULATION, TANKS (CONTAINERS), THERMAL CYCLING TESTS

**N79-10078\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### **LARGE SPACE SYSTEMS TECHNOLOGY, VOLUME 1**

E. C. NAUMANN, comp. and A. BUTTERFIELD, comp. (GE Co.) 1978 540 p Seminar held at Hampton, Va., 17-19 Jan. 1978 2 Vol.

(NASA-CP-2035-VOL-1; L-12068) Avail: NTIS HC A23/MF A01 CSCL 22B

CONFERENCES, LARGE SPACE STRUCTURES, MISSION PLANNING, ORBITAL ASSEMBLY, SPACE ERECTABLE STRUCTURES, TECHNOLOGY ASSESSMENT

## 15 LAUNCH VEHICLES AND SPACE VEHICLES

**N79-10097\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LARGE SPACE SYSTEMS TECHNOLOGY, VOLUME 2**

E. C. NAUMANN, comp. and A. BUTTERFIELD, comp. 1978 505 p Seminar held at Hampton, Va., 17-19 Jan. 1978 2 Vol. (NASA-CP-2035-VOL-2; L-12068-VOL-2) Avail: NTIS HC A22/MF A01 CSCL 22B

CONFERENCES, LARGE SPACE STRUCTURES, TECHNOLOGY ASSESSMENT

**N80-19145\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LARGE SPACE SYSTEMS TECHNOLOGY, 1979**

J. C. WARD, JR., comp. Feb. 1980 487 p refs Ann. Program Tech. Rev. (1st) held at Hampton, Va., 7-8 Nov. 1979 (NASA-CP-2118; L-13488) Avail: NTIS HC A21/MF A01 CSCL 22B

ANTENNA DESIGN, CONFERENCES, LARGE SPACE STRUCTURES, ORBITAL ASSEMBLY, RETRACTABLE EQUIPMENT

**N81-19164\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LARGE SPACE SYSTEMS TECHNOLOGY, 1980, VOLUME 1**

F. KOPRIVER, III, comp. Feb. 1981 445 p refs Presented at the 2nd Ann. Tech. Rev., Hampton, Va., 18-20 Nov. 1980 (NASA-CP-2168; L-14219-VOL-1) Avail: NTIS HC A19/MF A01 CSCL 22B

ANTENNA ARRAYS, CONTROL THEORY, LARGE SPACE STRUCTURES, SPACE PLATFORMS

**N81-19196\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **THE 1980 LARGE SPACE SYSTEMS TECHNOLOGY. VOLUME 2: BASE TECHNOLOGY**

F. KOPRIVER, III, comp. (Systems Management Associates, Hampton, Va.) Feb. 1981 188 p refs Second Annual Technical Review held in Hampton, Va., 18-20 Nov. 1980 (NASA-CP-2168-VOL-2; L-14219) Avail: NTIS HC A09/MF A01 CSCL 22B

CONFERENCES, LARGE SPACE STRUCTURES, ORBITAL ASSEMBLY, PLATFORMS, SPACE ERECTABLE STRUCTURES, SPACECRAFT ANTENNAS, STRUCTURAL ANALYSIS

**N81-26166\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STRUCTURAL DYNAMICS AND CONTROL OF LARGE SPACE STRUCTURES**

E. B. LIGHTNER, comp. Jun. 1981 136 p refs Proc. held at Hampton, Va., 30-31 Oct. 1980 (NASA-CP-2187; L-14609) Avail: NTIS HC A07/MF A01 CSCL 22B

CONFERENCES, DYNAMIC STRUCTURAL ANALYSIS, LARGE SPACE STRUCTURES, SELF ADAPTIVE CONTROL SYSTEMS, SYSTEMS ENGINEERING

**N82-14202\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **COMPARATIVE ANALYSES OF SPACE-TO-SPACE CENTRAL POWER STATIONS**

P. F. HOLLOWAY and L. B. GARRETT Dec. 1981 49 p refs (NASA-TP-1955; L-14766) Avail: NTIS HC A03/MF A01 CSCL 22B

COST EFFECTIVENESS, EARTH ORBITS, LASER APPLICATIONS, POWER EFFICIENCY, SPACE POWER UNIT REACTORS, TRANSFER ORBITS

**N82-14203\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **SYSTEM ANALYSIS APPROACH TO DERIVING DESIGN CRITERIA (LOADS) FOR SPACE SHUTTLE AND ITS PAYLOADS. VOLUME 1: GENERAL STATEMENT OF APPROACH**

R. S. RYAN, T. BULLOCK, W. B. HOLLAND, D. A. KROSS, and L. A. KIEFLING Dec. 1981 47 p (NASA-TP-1949; M-358) Avail: NTIS HC A03/MF A01 CSCL 22B

AERODYNAMIC LOADS, HUBBLE SPACE TELESCOPE, SPACECRAFT DESIGN, SPACELAB, STRUCTURAL DESIGN CRITERIA, SYSTEMS ANALYSIS

**N82-15106\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **SYSTEM ANALYSIS APPROACH TO DERIVING DESIGN CRITERIA (LOADS) FOR SPACE SHUTTLE AND ITS PAYLOADS. VOLUME 2: TYPICAL EXAMPLES**

R. S. RYAN, T. BULLOCK, W. B. HOLLAND, D. A. KROSS, and L. A. KIEFLING Dec. 1981 128 p refs (NASA-TP-1950; M-359-VOL-2) Avail: NTIS HC A07/MF A01 CSCL 22B

AEROSPACE SYSTEMS, AEROSPACE VEHICLES, DESIGN ANALYSIS, DYNAMIC LOADS, LOADS (FORCES), STRUCTURAL DESIGN CRITERIA

**N82-18275\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LARGE SPACE SYSTEMS TECHNOLOGY, 1981**

W. J. BOYER, comp. Mar. 1982 430 p refs Presented at Third Annual Technical Review, Hampton, Va., 16-19 Nov. 1981 (NASA-CP-2215-PT-1; L-15096) Avail: NTIS HC A19/MF A01 CSCL 22B

ATTITUDE CONTROL, CONFERENCES, LARGE SPACE STRUCTURES, SPACE PLATFORMS, STRUCTURAL DESIGN CRITERIA

**N82-19257\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LARGE SPACE SYSTEMS TECHNOLOGY, PART 2, 1981**

W. J. BOYER, comp. Mar. 1982 479 p refs Conf. held in Hampton, Va., 16-19 Nov. 1981 (NASA-CP-2215-PT-2; L-15096-PT-2) Avail: NTIS HC A21/MF A01 CSCL 22B

ANTENNA DESIGN, ANTENNAS, LARGE SPACE STRUCTURES, SHAPE CONTROL

**N82-20225\*#** National Aeronautics and Space Administration. Washington, D.C.

### **ORBITING QUARANTINE FACILITY. THE ANTAEUS REPORT**

D. L. DEVINCENZI, ed. and J. R. BAGBY, ed. (Colorado State Univ.) 1981 144 p refs (NASA-SP-454; NAS 1.21:454; LC-81-600179) Avail: NTIS HC A07/MF A01 CSCL 22B

A mission plan for the Orbiting Quarantine Facility (OQF) is presented. Coverage includes system overview, quarantine and protocol, the laboratory, support systems, cost analysis and possible additional uses of the OQF. For individual titles, see N82-20226 through N82-20232.

**N83-18819\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **MODELING, ANALYSIS, AND OPTIMIZATION ISSUES FOR LARGE SPACE STRUCTURES**

L. D. PINSON, comp., A. K. AMOS, comp. (AFOSR, Bolling AFB, Washington, D.C.), and V. B. VENKAYYA, comp. (AFWAL, Wright Patterson AFB, Ohio) Feb. 1983 222 p refs Proc. of workshop held in Williamsburg, Va., 13-14 May 1982 (NASA-CP-2258; NAS 1.55:2258; L-15564) Avail: NTIS HC A10/MF A01

DYNAMIC CONTROL, DYNAMIC RESPONSE, DYNAMIC STRUCTURAL ANALYSIS, LARGE SPACE STRUCTURES,

## 15 LAUNCH VEHICLES AND SPACE VEHICLES

MATHEMATICAL MODELS, OPTIMAL CONTROL, THERMAL STRESSES

**N83-22256\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### STRUCTURAL DYNAMICS AND CONTROL OF LARGE SPACE STRUCTURES, 1982

M. L. BRUMFIELD, comp. Washington Apr. 1983 261 p refs Workshop held in Hampton, Va., 21-22 Jan. 1982 (NASA-CP-2266; L-15579; NAS 1.55:2266) Avail: NTIS HC A12/MF A01 CSCL 22B

CONFERENCES, CONTROL THEORY, DYNAMIC STRUCTURAL ANALYSIS, LARGE SPACE STRUCTURES, SPACECRAFT CONTROL

**N83-26853\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### LARGE SPACE ANTENNA SYSTEMS TECHNOLOGY, PART 1

E. B. LIGHTNER, comp. May 1983 596 p refs Conf. held in Hampton, Va., 30 Nov. - 3 Dec. 1982 2 Vol. (NASA-CP-2269-PT-1; L-15614-PT-1; NAS 1.55:2269-PT-1) Avail: NTIS HC A25/MF A01 CSCL 22B

ANTENNA DESIGN, CONFERENCES, LARGE SPACE STRUCTURES, LONG TERM EFFECTS, PHASED ARRAYS, STRUCTURAL DESIGN, VERY LONG BASE INTERFEROMETRY

**N83-26879\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### LARGE SPACE ANTENNA SYSTEMS TECHNOLOGY, PART 2

E. B. LIGHTNER, comp. May 1983 469 p refs Conf. held in Hampton, Va., 30 Nov. - 3 Dec. 1982 2 Vol. (NASA-CP-2269-PT-2; L-15614-PT-2; NAS 1.55:2269-PT-2) Avail: NTIS HC A20/MF A01 CSCL 22B

CONFERENCES, LARGE SPACE STRUCTURES, SPACECRAFT ANTENNAS

**N83-32826\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### MODAL ANALYSIS OF A NONUNIFORM STRING WITH END MASS AND VARIABLE TENSION

M. H. RHEINFURTH and Z. J. GALABOFF Aug. 1983 24 p refs (NASA-TP-2198; NAS 1.60:2198) Avail: NTIS HC A02/MF A01 CSCL 20K

DISPLACEMENT, LATERAL STABILITY, SHAPES, STRINGS

**N83-32828\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### PERFORMANCE REQUIREMENTS ANALYSIS FOR PAYLOAD DELIVERY FROM A SPACE STATION

A. L. FRIEDLANDER (Science Applications, Inc.), J. K. SOLDNER (Science Applications, Inc.), J. BELL, ed., G. W. RICKS, R. E. KINCADE, D. DEATKINS, R. REYNOLDS, B. A. NADER, O. HILL, G. R. BABB et al. Jul. 1983 228 p refs (NASA-RP-1110; S-523; NAS 1.61:1110) Avail: NTIS HC A11/MF A01 CSCL 22B

Operations conducted from a space station in low Earth orbit which have different constraints and opportunities than those conducted from direct Earth launch were examined. While a space station relieves many size and performance constraints on the space shuttle, the space station's inertial orbit has different launch window constraints from those associated with customary Earth launches which reflect upon upper stage capability. A performance requirements analysis was developed to provide a reference source of parametric data, and specific case solutions and upper stage sizing trade to assist potential space station users and space station and upper stage developers assess the impacts of a space station on missions of interest. E.A.K.

**N84-17211\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### STEP EXPERIMENT REQUIREMENTS

M. L. BRUMFIELD, comp. Jan. 1984 347 p refs Workshop held in Hampton, Va., 28 Jun. - 1 Jul. 1983 (NASA-CP-2294; L-15733; NAS 1.55:2294) Avail: NTIS HC A15/MF A01 CSCL 22B

AEROSPACE SCIENCES, AEROSPACE TECHNOLOGY TRANSFER, CONFERENCES, LARGE SPACE STRUCTURES, NASA PROGRAMS, PLATFORMS, SPACE STATIONS, SPACEBORNE EXPERIMENTS

**N84-18277\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### SPACE STATION TECHNOLOGY, 1983

R. L. WRIGHT, ed. and C. R. MAYS, ed. Feb. 1984 189 p Workshop held in Williamsburg, Va., 28-31 Mar. 1983 (NASA-CP-2293; L-15732; NAS 1.55:2293) Avail: NTIS HC A09/MF A01 CSCL 22B

HEAT RADIATORS, LIFE SUPPORT SYSTEMS, MAN MACHINE SYSTEMS, SOFTWARE ENGINEERING, SPACE STATIONS, SPACECRAFT COMMUNICATION, USER REQUIREMENTS

**N84-24632\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### LONG DURATION EXPOSURE FACILITY (LDEF). MISSION 1 EXPERIMENTS

L. G. CLARK, ed., W. H. KINARD, ed., D. L. CARTER, JR., ed., and J. L. JONES, JR., ed. Washington Feb. 1984 196 p (NASA-SP-473; L-15230; NAS 1.21:473) Avail: NTIS HC A09/MF A01; also available SOD HC CSCL 22A

Spaceborne experiments using the space shuttle payload known as the Long Duration Exposure Facility are described. Experiments in the fields of materials, coatings, thermal systems, power and propulsion, electronic, and optics are discussed. For individual titles, see N84-24633 through N84-24690.

**N85-16989\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### OTV PROPULSION ISSUES

Washington Apr. 1984 296 p refs Conf. held in Cleveland, 3-4 Apr. 1984 (NASA-CP-2347; E-2171; NAS 1.55:2347) Avail: NTIS HC A13/MF A01 CSCL 22B

AEROASSIST, CONFERENCES, CRYOGENIC FLUIDS, ORBIT TRANSFER VEHICLES, PROPULSION SYSTEM CONFIGURATIONS

**N85-19003\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### SPACE SHUTTLE ORBITER TRIMMED CENTER-OF-GRAVITY EXTENSION STUDY Summary Report

W. I. SCALLION and W. P. PHILLIPS Mar. 1985 53 p refs (NASA-TP-2284; L-15701; NAS 1.60:2284) Avail: NTIS HC A04/MF A01 CSCL 22B

AERODYNAMIC CONFIGURATIONS, CANARD CONFIGURATIONS, CENTER OF GRAVITY, SPACE SHUTTLE ORBITERS

**N85-23813\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### LARGE SPACE ANTENNA SYSTEMS TECHNOLOGY, 1984

W. J. BOYER, comp. Apr. 1985 466 p refs Conf. held in Hampton, Va., 4-6 Dec. 1984 2 Vol. (NASA-CP-2368-PT-1; L-15950-PT-1; NAS 1.55:2368-PT-1) Avail: NTIS HC A20/MF A01 CSCL 22B

ANTENNA DESIGN, CONFERENCES, DYNAMIC STRUCTURAL ANALYSIS, LARGE SPACE STRUCTURES, SATELLITE ANTENNAS

## 15 LAUNCH VEHICLES AND SPACE VEHICLES

**N85-23840\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LARGE SPACE ANTENNA SYSTEMS TECHNOLOGY, 1984**

W. J. BOYER, comp. Apr. 1985 484 p refs Conf. held in Hampton, Va., 4-6 Dec. 1984 2 Vol.  
(NASA-CP-2368-PT-2; L-15950-PT-2; NAS 1.55:2368-PT-2)  
Avail: NTIS HC A21/MF A01 CSCL 22B

ANTENNA DESIGN, CONFERENCES, DYNAMIC STRUCTURAL ANALYSIS, LARGE SPACE STRUCTURES, SPACE SHUTTLE PAYLOADS, SPACE STATIONS

**N85-34148\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **SPACE STATION ROTATIONAL EQUATIONS OF MOTION**

M. H. RHEINFURTH and S. N. CARROLL Aug. 1985 21 p  
(NASA-TP-2511; NAS 1.60:2511) Avail: NTIS HC A02/MF A01 CSCL 22B

EQUATIONS OF MOTION, LARGE SPACE STRUCTURES, SPACE STATIONS, SPACECRAFT CONTROL

**N85-34149\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **POTENTIAL SPIN-OFFS OF THE CARBON DIOXIDE OBSERVATIONAL PLATFORM SYSTEM (CO-OPS) FOR REMOTE SENSING OPPORTUNITIES**

J. B. STEPHENS 1985 36 p refs  
(NASA-TP-2510; NAS 1.60:2510) Avail: NTIS HC A03/MF A01 CSCL 22B

ATMOSPHERIC COMPOSITION, CARBON DIOXIDE, CARBON DIOXIDE CONCENTRATION, REMOTE SENSING, WATER VAPOR

**N86-11215\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **PROBLEMS EXPERIENCED AND ENVISIONED FOR DYNAMICAL PHYSICAL SYSTEMS**

R. S. RYAN Aug. 1985 148 p refs  
(NASA-MP-2508; M-494; NAS 1.60:2508) Avail: NTIS HC A07/MF A01 CSCL 22B

CONTROL SYSTEMS DESIGN, LARGE SPACE STRUCTURES, SPACECRAFT DESIGN, SYSTEMS ENGINEERING

**N86-20460\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **STAR 48 SOLID ROCKET MOTOR NOZZLE ANALYSES AND INSTRUMENTED FIRINGS**

R. L. PORTER Mar. 1986 58 p refs  
(NASA-TP-2572; NAS 1.60:2572) Avail: NTIS HC A04/MF A01 CSCL 21H

COMPUTER PROGRAMS, NOZZLE DESIGN, ROCKET NOZZLES, SOLID PROPELLANT ROCKET ENGINES, STRESS ANALYSIS

**N86-24722\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **PASSIVE EDDY-CURRENT DAMPING AS A MEANS OF VIBRATION CONTROL IN CRYOGENIC TURBOMACHINERY**

R. E. CUNNINGHAM Feb. 1986 14 p refs  
(NASA-TP-2562; E-2762; NAS 1.60:2562) Avail: NTIS HC A02/MF A01 CSCL 13I

BEARINGS, CRYOGENICS, DAMPING, EDDY CURRENTS, ROTOR AERODYNAMICS, TURBINE PUMPS

**N86-30753\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **A MECHANICAL PROPERTY AND STRESS CORROSION EVALUATION OF VIM-ESR-VAR WORK STRENGTHENED AND DIRECT DOUBLE AGED INCONEL 718 BAR MATERIAL**

J. W. MONTANO Sep. 1986 37 p  
(NASA-TP-2634; NAS 1.60:2634) Avail: NTIS HC A03/MF A01 CSCL 11F

ARC MELTING, ELECTROSLAG REFINING, INCONEL (TRADEMARK), INDUCTION HEATING, MECHANICAL PROPERTIES, STRESS CORROSION, VACUUM MELTING

## 16

## SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques.

**N78-20176\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **STATIC AND DYNAMIC STABILITY ANALYSIS OF THE SPACE SHUTTLE VEHICLE-ORBITER**

W. J. CHYU, R. K. CAVIN (Texas A and M Univ., College Station), and L. L. ERICKSON Mar. 1978 62 p refs  
(NASA-TP-1179; A-7217) Avail: NTIS HC A04/MF A01 CSCL 22B

DYNAMIC STABILITY, SPACE SHUTTLE ORBITERS, STATIC STABILITY

**N78-33135\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **NITRIC OXIDE PRODUCTION IN THE STRATOSPHERE WITHIN THE SPACE SHUTTLE'S SOLID ROCKET MOTOR PLUMES**

R. I. GOMBERG, J. R. BRANNAN, and L. R. BONEY Oct. 1978 31 p refs  
(NASA-TP-1305; L-12182) Avail: NTIS HC A03/MF A01 CSCL 04A

NITROGEN OXIDES, SOLID PROPELLANT ROCKET ENGINES, SPACE SHUTTLES, STRATOSPHERE

**N79-21119\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **NEAR-FIELD SONIC-BOOM PRESSURE SIGNATURES FOR THE SPACE SHUTTLE LAUNCH AND ORBITER VEHICLES AT MACH 6**

G. C. ASHBY, JR. Apr. 1979 36 p refs  
(NASA-TP-1405; L-12638) Avail: NTIS HC A03/MF A01 CSCL 20A

LAUNCH VEHICLES, SIGNATURES, SONIC BOOMS, SPACE SHUTTLE ORBITERS

**N80-30367\*#** National Aeronautics and Space Administration. Washington, D.C.

### **THE SPACE SHUTTLE AT WORK**

H. ALLAWAY 1979 83 p Original contains color illustrations  
(NASA-SP-432; NASA-EP-156) Avail: NTIS HC \$3.75/MF \$3.75 CSCL 28B

The concept of the orbital flight of the space shuttle and the development of the space transportation system are addressed. How the system came to be, why it is designed the way it is, what is expected of it, and how it may grow are among the questions considered. Emphasis is placed on the effect of the space transportation system on U.S. space exploration in the next decade, including plans to make space an extension of life on the Earth's surface.  
J.M.S.

**N81-16111\*#** National Aeronautics and Space Administration. Washington, D.C.

### **SPACE TRANSPORTATION SYSTEM AND ASSOCIATED PAYLOADS: GLOSSARY, ACRONYMS, AND ABBREVIATIONS**

Jan. 1981 265 p  
(NASA-RP-1059) Avail: NTIS HC A12/MF A01 CSCL 22A

A collection of acronyms in everyday use concerning shuttle activities is presented. A glossary of terms pertaining to the Space Transportation System is included.  
E.D.K.



**N82-20236\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SENSITIVITY ANALYSIS OF THE SPACE SHUTTLE TO ASCENT WIND PROFILES**

O. E. SMITH and L. D. AUSTIN, JR. Mar. 1982 21 p refs (NASA-TP-1988; M-374; NAS 1.60:1988) Avail: NTIS HC A02/MF A01 CSCL 22B

CLIMBING FLIGHT, FLIGHT CONDITIONS, FLIGHT SIMULATION, SPACE SHUTTLES, SPACECRAFT LAUNCHING, WIND EFFECTS, WIND PROFILES

**N82-33417\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**ATMOSPHERIC CONSTRAINT STATISTICS FOR THE SPACE SHUTTLE MISSION PLANNING**

O. E. SMITH, G. W. BATTS (Computer Sciences Corp., Huntsville, Ala.), and J. A. WILLETT (Computer Sciences Corp., Huntsville, Ala.) Aug. 1982 39 p refs (NASA-TP-2069; NAS 1.60:2069) Avail: NTIS HC A03/MF A01 CSCL 22A

ATMOSPHERIC EFFECTS, MISSION PLANNING, SPACE SHUTTLES

**N84-10115\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SHUTTLE PERFORMANCE: LESSONS LEARNED, PART 1**

J. P. ARRINGTON, comp. and J. J. JONES, comp. Washington Oct. 1983 647 p refs Conf. held in Hampton, Va., 8-10 Mar. 1983 2 Vol.

(NASA-CP-2283-PT-1; L-15673-PT-1; NAS 1.55:2283-PT-1)

Avail: NTIS HC A99/MF A01 CSCL 22B

AEROTHERMODYNAMICS, ASCENT TRAJECTORIES, CONFERENCES, ENTRY GUIDANCE (STS), SPACE SHUTTLES

**N84-10144\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SHUTTLE PERFORMANCE: LESSONS LEARNED, PART 2**

J. P. ARRINGTON, comp. and J. J. JONES, comp. Washington Oct. 1983 746 p refs Conf. held in Hampton, Va., 8-10 Mar. 1983 2 Vol.

(NASA-CP-2283-PT-2; L-15673-PT-2; NAS 1.55:2283-PT-2)

Avail: NTIS HC A99/MF A01 CSCL 22B

AEROTHERMODYNAMICS, ASCENT TRAJECTORIES, CONFERENCES, ENTRY GUIDANCE (STS), SPACE SHUTTLES

**N85-15778\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF AERODYNAMIC AND ANGLE-OF-ATTACK UNCERTAINTIES ON THE MAY 1979 ENTRY FLIGHT CONTROL SYSTEM OF THE SPACE SHUTTLE FROM MACH 8 TO 1.5**

H. W. STONE and R. W. POWELL Jan. 1985 137 p refs (NASA-TP-2365; L-15813; NAS 1.60:2365) Avail: NTIS HC A07/MF A01 CSCL 22B

AERODYNAMIC CHARACTERISTICS, ANGLE OF ATTACK, DEGREES OF FREEDOM, FLIGHT CONTROL, SPACE SHUTTLE ORBITERS, SPACECRAFT REENTRY

**N85-19007\*#** National Aeronautics and Space Administration. Washington, D.C.

**SPACE TRANSPORTATION SYSTEM AND ASSOCIATED PAYLOADS: GLOSSARY, ACRONYMS, AND ABBREVIATIONS**

Feb. 1985 309 p Previously announced as N81-16111 (NASA-RP-1059-REV; NAS 1.61:1059-REV) Avail: NTIS HC A14/MF A01 CSCL 22B

A collection of acronyms now in everyday use in the Shuttle world are listed. It is a combination of lists that were prepared at the Kennedy and Johnson Space Centers and by the Air Force.

B.G.

**N85-33169\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**PROCEDURE FOR ESTIMATING ORBITAL DEBRIS RISKS**

J. L. CRAFTS and J. P. LINDBERG Aug. 1985 11 p refs (NASA-TP-2507; M-495; NAS 1.60:2507) Avail: NTIS HC A02/MF A01 CSCL 22A

EARTH ORBITS, ENVIRONMENT EFFECTS, ESTIMATES, RISK, SPACE DEBRIS

17

**SPACE COMM., SPACECRAFT COMM., COMMAND AND TRACKING**

Includes telemetry; space communications networks; astronavigation and guidance; and radio blackout.

**N78-10200\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PRELAUNCH TESTING OF THE LASER GEODYNAMIC SATELLITE (LAGEOS)**

M. W. FITZMAURICE, P. O. MINOTT, J. B. ABSHIRE, and H. E. ROWE 1977 100 p refs

(NASA-TP-1062; G-7702-F16) Avail: NTIS HC A05/MF A01

CSCL 22A

LAGEOS (SATELLITE), LASER RANGE FINDERS, PRELAUNCH TESTS

**N78-28159\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CARRIER-INTERFERENCE RATIOS FOR FREQUENCY SHARING BETWEEN FREQUENCY-MODULATED AMPLITUDE-MODULATED-VESTIGIAL-SIDEBAND TELEVISION SYSTEMS**

S. P. BARNES and E. F. MILLER Aug. 1978 29 p refs

(NASA-TP-1264; E-9478) Avail: NTIS HC A03/MF A01 CSCL 17B

AMPLITUDE MODULATION, ELECTROMAGNETIC INTERFERENCE, FREQUENCY MODULATION, TELEVISION SYSTEMS

**N78-33137\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMAL CHARACTERISTICS OF THE 12-GIGAHERTZ, 200-WATT OUTPUT STAGE TUBE FOR THE COMMUNICATIONS TECHNOLOGY SATELLITE**

A. N. CURREN Oct. 1978 39 p refs

(NASA-TP-1344; E-9560) Avail: NTIS HC A03/MF A01 CSCL 17B

COMMUNICATIONS TECHNOLOGY SATELLITE, HEAT TRANSFER, TRAVELING WAVE TUBES

**N79-21120\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMAL ANOMALIES OF THE TRANSMITTER EXPERIMENT PACKAGE ON THE COMMUNICATIONS TECHNOLOGY SATELLITE**

R. E. ALEXOVICH and A. N. CURREN Apr. 1979 113 p refs (NASA-TP-1410; E-9735) Avail: NTIS HC A06/MF A01 CSCL 17B

ANOMALIES, COMMUNICATIONS TECHNOLOGY SATELLITE, SATELLITE TRANSMISSION

## 17 SPACE COMM., SPACECRAFT COMM., COMMAND AND TRACKING

**N81-18082\*#** National Aeronautics and Space Administration, Washington, D.C.

### **RADIO-WAVE PROPAGATION FOR SPACE COMMUNICATIONS SYSTEMS**

L. J. IPPOLITO Feb. 1981 63 p refs  
(NASA-TP-1770; EC-4) Avail: NTIS HC A04/MF A01 CSCL 17B

ATMOSPHERIC ATTENUATION, DEPOLARIZATION, RADIO TRANSMISSION, SATELLITE TRANSMISSION, SPACE COMMUNICATION

**N81-23182\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

### **EXISTENCE AND UNIQUENESS OF SOLUTIONS TO A CLASS OF NONLINEAR-OPERATOR-DIFFERENTIAL EQUATIONS ARISING IN AUTOMATED SPACESHIP NAVIGATION**

V. M. BOGDAN (Catholic Univ.) Washington May 1981 23 p refs

(NASA-TP-1860; S-506; JSC-16755) Avail: NTIS HC A02/MF A01 CSCL 17G

DIFFERENTIAL EQUATIONS, EXISTENCE THEOREMS, NONLINEAR EQUATIONS, SPACE NAVIGATION, SPACECRAFT CONTROL, UNIQUENESS THEOREM

**N85-21246\*#** National Aeronautics and Space Administration, Wallops Flight Center, Wallops Island, Va.

### **WIND-WEIGHTING FOR SOUNDING ROCKETS WITH A TELEMETRY SYSTEM**

F. M. BOYKIN Apr. 1985 12 p  
(NASA-TP-2438; NAS 1.60:2438) Avail: NTIS HC A02/MF A01 CSCL 09F

RADIOSONDES, TELEMETRY, TRACKING (POSITION), WIND MEASUREMENT

**N86-23620\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **SPACE STATION WORKSTATION TECHNOLOGY WORKSHOP REPORT**

K. L. MOE, C. M. EMERSON, D. R. EIKE (Carlow Associates, Fairfax, Va.), and T. B. MALONE (Carlow Associates, Fairfax, Va.) Mar. 1985 135 p

(NAS5-28597)  
(NASA-CP-2414; 4033-85-1DRE; NAS 1.55:2414) Avail: NTIS HC A07/MF A01 CSCL 22B

HUMAN FACTORS ENGINEERING, MAN MACHINE SYSTEMS, SPACE STATIONS, TECHNOLOGY ASSESSMENT, WORKSTATIONS

## 18

### **SPACECRAFT DESIGN, TESTING AND PERFORMANCE**

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

**N76-28296\*#** National Aeronautics and Space Administration, Washington, D.C.

### **VIKING 1: EARLY RESULTS**

21 Aug. 1976 76 p  
(NASA-SP-408) Avail: NTIS HC \$2.00 CSCL 22B

A brief outline of the Viking 1 mission to Mars is followed by descriptions of the Martian landing site and the scientific instrumentation aboard Viking 1 orbiter and lander. Measurements of the Martian atmosphere provided data on its molecular composition, temperature and pressure. The detection of nitrogen in the Martian atmosphere indicates the existence of life. Panoramic photographs of the Martian surface were also obtained and are shown. Preliminary chemical and biological investigations on

samples of Martian soil indicated the presence of the elements iron, calcium, silicon, titanium and aluminum as major constituents. Observed biochemical reactions were judged conducive of biological activity. G.G.

**N77-33259\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

### **ENTRY DYNAMICS OF SPACE SHUTTLE ORBITER WITH LONGITUDINAL STABILITY AND CONTROL UNCERTAINTIES AT SUPERSONIC AND HYPERSONIC SPEEDS**

H. W. STONE and R. W. POWELL Oct. 1977 67 p refs  
(NASA-TP-1084; L-11288) Avail: NTIS HC A04/MF A01 CSCL 22B

AERODYNAMIC STABILITY, CONTROL STABILITY, LONGITUDINAL STABILITY, SPACE SHUTTLE ORBITERS

**N78-13119\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

### **ENTRY DYNAMICS OF SPACE SHUTTLE ORBITER WITH LATERAL-DIRECTIONAL STABILITY AND CONTROL UNCERTAINTIES AT SUPERSONIC AND HYPERSONIC SPEEDS**

H. W. STONE and R. W. POWELL Dec. 1977 103 p refs  
(NASA-TP-1011; L-11112) Avail: NTIS HC A06/MF A01 CSCL 22A

ATMOSPHERIC ENTRY, DIRECTIONAL STABILITY, LATERAL STABILITY, SPACE SHUTTLE ORBITERS

**N78-21200\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **THE N-BOD2 USER'S AND PROGRAMMER'S MANUAL**

H. P. FRISCH Feb. 1978 307 p refs  
(NASA-TP-1145; G-7702-F22) Avail: NTIS HC A14/MF A01 CSCL 22B

ATTITUDE CONTROL, COMPUTER SYSTEMS PROGRAMS, DIGITAL COMPUTERS, SPACECRAFT CONTROL, USER MANUALS (COMPUTER PROGRAMS)

**N78-25123\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **A DIGITAL COMPUTER PROGRAM FOR THE DYNAMIC INTERACTION SIMULATION OF CONTROLS AND STRUCTURE (DISCOS), VOLUME 1**

C. S. BODLEY (Martin Marietta Corp., Denver), A. D. DEVERS (Martin Marietta Corp., Denver), A. C. PARK (Martin Marietta Corp., Denver), and H. P. FRISCH May 1978 169 p refs  
(NASA-TP-1219-VOL-1; G-7702-F26-VOL-1) Avail: NTIS HC A08/MF A01 CSCL 22B

ATTITUDE CONTROL, COMPUTERIZED SIMULATION, SPACECRAFT CONTROL

**N78-25124\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **A DIGITAL COMPUTER PROGRAM FOR THE DYNAMIC INTERACTION SIMULATION OF CONTROLS AND STRUCTURE (DISCOS), VOLUME 2**

C. S. BODLEY (Martin Marietta Corp., Denver), A. D. DEVERS (Martin Marietta Corp., Denver), A. C. PARK (Martin Marietta Corp., Denver), and H. P. FRISCH May 1978 368 p  
(NASA-TP-1219-VOL-2; G-7702-F26-VOL-2) Avail: NTIS HC A16/MF A01 CSCL 22B

ATTITUDE CONTROL, COMPUTERIZED SIMULATION, SPACECRAFT CONTROL

**N79-15149\*#** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

### **JUPITER PROBE CHARGING STUDY**

C. K. PURVIS Jan. 1979 38 p refs  
(NASA-TP-1263; E-9167) Avail: NTIS HC A03/MF A01 CSCL 22B

ELECTROSTATIC CHARGE, JUPITER PROBES, SPACECRAFT CHARGING, SPACECRAFT DESIGN

**N79-24001\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SPACECRAFT CHARGING TECHNOLOGY, 1978**

1979 908 p refs Conf. held at Colorado Springs, Colo., 31 Oct. - 2 Nov. 1978; sponsored by NASA and AFGL (NASA-CP-2071; AFGL-TR-79-0082) Avail: NTIS HC A99/MF A01 CSCL 22B

AEROSPACE ENVIRONMENTS, CONFERENCES, PARTICLE INTERACTIONS, PLASMA INTERACTIONS, SPACECRAFT CHARGING, SPACECRAFT ENVIRONMENTS

**N79-27237\*#** Martin Marietta Aerospace, Denver, Colo.

**HANDBOOK ON ASTRONAUT CREW MOTION DISTURBANCES FOR CONTROL SYSTEM DESIGN**

M. C. KULLAS May 1979 196 p refs

(NAS2-2982)

(NASA-RP-1025; L-12299) Avail: NTIS HC A09/MF A01 CSCL 22B

The analyses and results pertinent to the characterization of the disturbances imparted to the Skylab vehicle by the T-013 crew motion experiments are summarized. Guidelines to help control system designers assess anticipated crew motion disturbances during the design cycle of a new manned spacecraft control system are provided. These guidelines, in conjunction with the T-013 characterizations outlined, begin with the control system conceptual design and conclude with preliminary expectations for pointing performance as affected by crew motions. Block diagrams to highlight the contents so that the reader can easily identify the information and data flow are used. These diagrams provide a handy cross reference of related topics. S.E.S.

**N80-16091\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**ORBITER LANDING LOADS MATH MODEL DESCRIPTION AND CORRELATION WITH ALT FLIGHT DATA**

D. A. HAMILTON, J. A. SCHLIESING, and G. A. ZUPP, JR. Washington Jan. 1980 27 p refs

(NASA-RP-1056; JSC-16202; S-498) Avail: NTIS HC A03/MF A01 CSCL 22B

Results of the space shuttle approach and landing test are examined in order to assess landing gear characteristics and performance and verify landing dynamic analyses. The landing gears were instrumented with load-calibrated strain gages, a wheel-speed sensor, and strut stroke measurement devices. The mathematical procedure used in predicting the shuttle touchdown loads and dynamics is presented together with the comparisons between measured flight data and the analytical predictions. Conclusions from these data are also presented. J.M.S.

**N80-29417\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYSIS OF SPACE SHUTTLE ORBITER ENTRY DYNAMICS FROM MACH 10 TO MACH 2.5 WITH THE NOVEMBER 1976 FLIGHT CONTROL SYSTEM**

R. W. POWELL and H. W. STONE Aug. 1980 163 p (NASA-TP-1667; L-13344) Avail: NTIS HC A08/MF A01 CSCL 22B

ATMOSPHERIC ENTRY SIMULATION, AUTOMATIC PILOTS, CONTROL SIMULATION, REENTRY GUIDANCE, SPACE SHUTTLE ORBITERS

**N80-32429\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DEVELOPMENT OF THE REENTRY FLIGHT DYNAMICS SIMULATOR FOR EVALUATION OF SPACE SHUTTLE ORBITER ENTRY SYSTEMS**

L. F. ROWELL, R. W. POWELL, and H. W. STONE, JR. Washington Oct. 1980 97 p refs (NASA-TP-1700; L-13662) Avail: NTIS HC A05/MF A01 CSCL 14B

COMPUTERIZED SIMULATION, DIGITAL COMPUTERS, ONBOARD EQUIPMENT, REENTRY GUIDANCE, SPACE SHUTTLE ORBITERS, SPACECRAFT REENTRY

**N81-10100\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VIKING '75 SPACECRAFT DESIGN AND TEST SUMMARY. VOLUME 1: LANDER DESIGN**

N. A. HOLMBERG, R. P. FAUST, and H. M. HOLT Nov. 1980 213 p refs 2 Vol.

(NASA-RP-1027-VOL-1; L-12087-VOL-1) Avail: NTIS HC A10/MF A01 CSCL 22B

The Viking Mars program is summarized. The design of the Viking lander spacecraft is described. T.M.

**N81-10101\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VIKING '75 SPACECRAFT DESIGN AND TEST SUMMARY. VOLUME 2: ORBITER DESIGN**

N. A. HOLMBERG, R. P. FAUST, and H. M. HOLT Nov. 1980 318 p 2 Vol.

(NASA-RP-1027-VOL-2; L-12087-VOL-2) Avail: NTIS HC A14/MF A01 CSCL 22B

The design of the Viking orbiter spacecraft is described. System configuration, telecommunications, and guidance and control requirements are presented. T.M.

**N81-11102\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VIKING '75 SPACECRAFT DESIGN AND TEST SUMMARY. VOLUME 3: ENGINEERING TEST SUMMARY**

N. A. HOLMBERG, R. P. FAUST, and H. M. HOLT Nov. 1980 107 p refs

(NASA-RP-1027-VOL-3; L-12087-VOL-3) Avail: NTIS HC A06/MF A01 CSCL 22B

The engineering test program for the lander and the orbiter are presented. The engineering program was developed to achieve confidence that the design was adequate to survive the expected mission environments and to accomplish the mission objective. T.M.

**N81-13082\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DECOUPLED CONTROL OF A LONG FLEXIBLE BEAM IN ORBIT**

H. A. HAMER and K. G. JOHNSON Dec. 1980 77 p refs (NASA-TP-1740; L-13726) Avail: NTIS HC A05/MF A01 CSCL 22B

ATTITUDE CONTROL, DECOUPLING, FEEDBACK CONTROL, LARGE SPACE STRUCTURES, MODAL RESPONSE

**N81-19218\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**PRELIMINARY VIBRATION, ACOUSTIC, AND SHOCK DESIGN AND TEST CRITERIA FOR COMPONENTS ON THE LIGHTWEIGHT EXTERNAL TANK (LWT)**

Feb. 1981 322 p refs (NASA-RP-1074; M-343) Avail: NTIS HC A14/MF A01 CSCL 22B

The Space Shuttle LWT is divided into zones and subzones. Zones are designated primarily to assist in determining the applicable specifications. A subzone (general Specification) is available for use when the location of the component is known but component design and weight are not well defined. When the location, weight, and mounting configuration of the component are known, specifications for appropriate subzone weight ranges are available. Along with the specifications are vibration, acoustic, shock, transportation, handling, and acceptance test requirements and procedures. A method of selecting applicable vibration, acoustic, and shock specifications is presented. A.R.H.

## 18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

**N81-21116\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PERFORMANCE OF A HAYNES 188 METALLIC STANDOFF THERMAL PROTECTION SYSTEM AT MACH 7**

D. E. AVERY Apr. 1981 44 p refs  
(NASA-TP-1802; L-13903) Avail: NTIS HC A03/MF A01  
CSCL 22B

AEROTHERMODYNAMICS, COBALT ALLOYS, REENTRY SHIELDING, THERMAL PROTECTION

**N81-25138\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **PITFALLS AND GUIDELINES FOR THE NUMERICAL EVALUATION OF MODERATE-ORDER SYSTEM FREQUENCY RESPONSE**

H. P. FRISCH Jun. 1981 36 p refs  
(NASA-TP-1814) Avail: NTIS HC A03/MF 01 CSCL 22C  
DYNAMIC RESPONSE, ERROR ANALYSIS, FEEDBACK CONTROL, NUMERICAL ANALYSIS

**N81-25139\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **TIME AND FREQUENCY DOMAIN ANALYSIS OF SAMPLED DATA CONTROLLERS VIA MIXED OPERATION EQUATIONS**

H. P. FRISCH Jun. 1981 25 p refs  
(NASA-TP-1817) Avail: NTIS HC A02/MF A01 CSCL 22B  
DYNAMIC RESPONSE, FREQUENCY ANALYZERS, NUMERICAL ANALYSIS, SPACECRAFT CONTROL, SPACECRAFT GUIDANCE

**N81-25140\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **REDUCED ORDER FEEDBACK CONTROL EQUATIONS FOR LINEAR TIME AND FREQUENCY DOMAIN ANALYSIS**

H. P. FRISCH Jun. 1981 27 p refs  
(NASA-TP-1818) Avail: NTIS HC A03/MF A01 CSCL 22B  
ALGORITHMS, FEEDBACK CONTROL, FREQUENCY ANALYZERS, NUMERICAL ANALYSIS, SPACECRAFT CONTROL, SPACECRAFT GUIDANCE

**N81-29154\*#** National Aeronautics and Space Administration. Washington, D.C.

### **STAGES TO SATURN: A TECHNOLOGICAL HISTORY OF THE APOLLO/SATURN LAUNCH VEHICLES**

R. E. BILSTEIN 1981 508 p refs  
(NASA-SP-4206) Avail: NTIS HC A22/MF A01 CSCL 22B

The origins of the Saturn 1 launch vehicle as a test bed and the development of the uprated Saturn B as an interim booster for the orbital testing of the first Apollo capsules are reviewed in this narrative account of technological advances responsible for the AS-506 launch vehicle and the success of the Apollo 11 flight. The evolution of the engine, including the development of high energy liquid hydrogen engines and of insulation for extended storage of cryogenic propellants in vehicle tanks are described as well as advances in computer technology for the guidance and control systems. Problems encountered in scaling components and systems for lunar missions are explored as well as political and administrative aspects of the Apollo-Saturn project. A.R.H.

**N81-29155\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **METEOROID BUMPER EXPERIMENT ON EXPLORER 46**

D. H. HUMES Jul. 1981 31 p refs  
(NASA-TP-1879; L-14329) Avail: NTIS HC A02/MF A01  
CSCL 22B

BUMPERS, EXPLORER SATELLITES, METEOROID HAZARDS, METEOROID PROTECTION, SPACECRAFT SHIELDING

**N82-12109\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **SPACECRAFT DYNAMICS AS RELATED TO LABORATORY EXPERIMENTS IN SPACE**

G. H. FICHTL, ed., B. N. ANTAR, ed., and F. G. COLLINS, ed. Nov. 1981 206 p refs Workshop held in Huntsville, Ala., 1-2 May 1979

(NASA-CP-2199; M-362) Avail: NTIS HC A10/MF A01 CSCL 22B

CONFERENCES, EXPERIMENT DESIGN, FLUID MECHANICS, PHYSICS AND CHEMISTRY EXPERIMENT IN SPACE, SPACEBORNE EXPERIMENTS, SPACECRAFT MOTION

**N82-14213\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SPACECRAFT CHARGING TECHNOLOGY, 1980**

Washington Oct. 1981 1005 p refs Conf. held in Colorado Springs, 12-14 Nov. 1980; sponsored by AFGL and NASA Lewis Research Center

(NASA-CP-2182; AFGL-TR-81-0270) Avail: NTIS HC A99/MF A01 CSCL 22B

CONFERENCES, DIELECTRIC PROPERTIES, ELECTRON EMISSION, ELECTRON IRRADIATION, PLASMA INTERACTIONS, SPACE ENVIRONMENT SIMULATION, SPACECRAFT CHARGING, SPACECRAFT DESIGN

**N82-14276\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **INTERACTIVE DESIGN AND ANALYSIS OF FUTURE LARGE SPACECRAFT CONCEPTS**

L. B. GARRETT Dec. 1981 32 p refs Presented at the 16th AIAA Thermophys. Conf., Palo Alto, Calif., 23-25 Jun. 1981  
(NASA-TP-1937; L-14739) Avail: NTIS HC A03/MF A01  
CSCL 22B

ARTIFICIAL SATELLITES, COMPUTER AIDED DESIGN, INTERACTIVE CONTROL, LARGE SPACE STRUCTURES, ORBITAL SPACE STATIONS, SPACECRAFT DESIGN, STRUCTURAL MEMBERS

**N82-14277\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **THERMAL AND AEROTHERMAL PERFORMANCE OF A TITANIUM MULTIWALL THERMAL PROTECTION SYSTEM**

D. E. AVERY, J. L. SHIDELER, and R. N. STUCKEY (Johnson Space Center) Dec. 1981 59 p refs

(NASA-TP-1961; L-14719) Avail: NTIS HC A04/MF A01  
CSCL 22B

AEROTHERMODYNAMICS, CERAMIC COATINGS, PROTECTIVE COATINGS, SPACE SHUTTLES, THERMAL PROTECTION, TILES, TITANIUM

**N82-15116\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **THE AERODYNAMICS OF BODIES IN A RAREFIED IONIZED GAS WITH APPLICATIONS TO SPACECRAFT ENVIRONMENTAL DYNAMICS**

N. H. STONE Nov. 1981 320 p refs  
(NASA-TP-1933; M-361) Avail: NTIS HC A14/MF A01 CSCL 22B

AERODYNAMICS, COLLISIONLESS PLASMAS, MAGNETO-HYDRODYNAMIC FLOW, PLASMA INTERACTIONS, RAREFIED GAS DYNAMICS, SPACECRAFT CHARGING

**N82-16147\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 6: PROGRAM AND SYSTEMS SUMMARIES: MECHANICAL AND THERMAL DETAILS Final Report**

R. O. WALES, ed. Nov. 1981 272 p refs 6 Vol.

(NAS5-25464)

(NASA-RP-1080-VOL-1; REPT-81F0034-VOL-1) Avail: NTIS HC A12/MF A01 CSCL 22B

The overall mission and spacecraft systems, testing, and operations are summarized. The mechanical subsystems are reviewed, encompassing mechanical design requirements; separation and deployment mechanisms; design and performance evaluation; and the television camera reflector monitor. Thermal control and contamination are discussed in terms of thermal control subsystems, design validation, subsystems performance, the advanced flight experiment, and the quartz-crystal microbalance contamination monitor. N.W.

**N82-16148\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 2: ORBIT AND ATTITUDE CONTROLS Final Report**

R. O. WALES, ed. Nov. 1981 289 p refs 6 Vol.

(NAS5-25464)

(NASA-RP-1080-VOL-2; REPT-81F0034-VOL-2) Avail: NTIS HC A13/MF A01

Attitude control is reviewed, encompassing the attitude control subsystem, spacecraft attitude precision pointing and slewing adaptive control experiment, and RF interferometer experiment. The spacecraft propulsion system (SPS) is discussed, including subsystem, SPS design description and validation, orbital operations and performance, in-orbit anomalies and contingency operations, and the cesium bombardment ion engine experiment. Thruster failure due to plugging of the propellant feed passages, a major cause for mission termination, are considered among the critical generic failures on the satellite. N.W.

**N82-16149\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 3: TELECOMMUNICATIONS AND POWER Final Report**

R. O. WALES, ed. Nov. 1981 298 p refs 6 Vol.

(NAS5-25464)

(NASA-RP-1080-VOL-3; REPT-81F0034-VOL-3) Avail: NTIS HC A13/MF A01 CSCL 22B

Functional design requirements and in-orbit operations, performance, and anomalies are discussed for (1) the communications subsystem, (2) the electrical power system, and (3) the telemetry and command subsystem. The latter includes a review of ground support. Tracking and data relay experiments and the Apollo-Soyuz test program are reviewed. N.W.

**N82-16150\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 4: TELEVISION EXPERIMENTS Final Report**

R. O. WALES, ed. Nov. 1981 149 p refs 6 Vol.

(NAS5-25464)

(NASA-RP-1080-VOL-4; REPT-81F0034-VOL-4) Avail: NTIS HC A04/MF A01 CSCL 22B

Experiments sponsored by the US Department of Health Education and Welfare are discussed, including telecommunications, Alaskan health service, Appalachian education satellite project, and the University of the West Indies. The Satellite Instructional Television Experiment in India is reviewed. Independent television experiments are addressed, including AIDSAT and Project Look Up. N.W.

**N82-16151\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 5: PROPAGATION EXPERIMENTS Final Report**

R. O. WALES, ed. Nov. 1981 302 p refs 6 Vol.

(NAS5-25464)

(NASA-RP-1080-VOL-5; REPT-81F0034-VOL-5) Avail: NTIS HC A14/MF A01 CSCL 22B

Propagation experiments at 1550 MHz to 1650 MHz are reviewed, including the Integrated L-Band Experiments system and results, and the Mobile L-Band Terminals for Satellite Communication system. Experiments at 4 GHz to 6 GHz are reported, including the Radio Frequency Interferometer Measurements system and results, and Earth station antenna evaluations. Experiments above 10 GHz are discussed, including Comsat and ATS-6 millimeter wave propagation/experiments, and communication ATS-6 version at 20 and 30 GHz. N.W.

**N82-16152\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ATS-6 ENGINEERING PERFORMANCE REPORT. VOLUME 6: SCIENTIFIC EXPERIMENTS Final Report**

R. O. WALES, ed. Nov. 1981 166 p refs 6 Vol.

(NAS5-25464)

(NASA-RP-1080-VOL-6; REPT-81F0034-VOL-6) Avail: NTIS HC A08/MF A01 CSCL 22B

Evaluations include a very high resolution radiometer, a radio beacon experiment, environmental measurement experiments (EME), EME support hardware, EME anomalies and failures, EME results, and US/USSR magnetometer experiments. N.W.

**N82-16153\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE MICROWAVE RADIOMETER SPACECRAFT: A DESIGN STUDY**

R. L. WRIGHT, ed. Dec. 1981 239 p refs

(NASA-RP-1079; L-14258) Avail: NTIS HC A11/MF A01 CSCL 22B

A large passive microwave radiometer spacecraft with near all weather capability of monitoring soil moisture for global crop forecasting was designed. The design, emphasizing large space structures technology, characterized the mission hardware at the conceptual level in sufficient detail to identify enabling and pacing technologies. Mission and spacecraft requirements, design and structural concepts, electromagnetic concepts, and control concepts are addressed. For individual titles, see N82-16154 through N82-16167.

**N82-20238\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**APPLICATION OF A COMPUTERIZED VIBROACOUSTIC DATA BANK FOR RANDOM VIBRATION CRITERIA DEVELOPMENT**

R. C. FEREBEE Mar. 1982 32 p refs

(NASA-TP-1998; NAS 1.60:1998; M-376) Avail: NTIS HC A03/MF A01 CSCL 09B

ACOUSTICS, DATA BASES, POWER SPECTRA, RANDOM VIBRATION, STRUCTURAL DESIGN CRITERIA, USER MANUALS (COMPUTER PROGRAMS)

**N82-25291\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**TWELFTH SPACE SIMULATION CONFERENCE: SHUTTLE PLUS ONE. A NEW VIEW OF SPACE**

R. T. HOLLINGSWORTH, ed. 1982 339 p refs Conf. held in Pasadena, Calif., 17-19 May 1982; sponsored by JPL, IES, AIAA and the Am. Soc. for Testing and Mater.

(NASA-CP-2229; NAS 1.55:2229; REPT-82B0455) Avail: NTIS HC A15/MF A01 CSCL 22B

GALILEO PROBE, REMOTE SENSING, SPACE ENVIRONMENT SIMULATION, SPACE SHUTTLE PAYLOADS, SPACE SHUTTLES, SPACE SIMULATORS, SPACECRAFT CONTAMINATION, SPACECRAFT MOTION, THERMAL PROTECTION

## 18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

**N82-33421\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ILLUMINATION FROM SPACE WITH ORBITING SOLAR-REFLECTOR SPACECRAFT**

J. E. CANADY, JR. and J. L. ALLEN, JR. Sep. 1982 90 p refs

(NASA-TP-2065; L-15127; NAS 1.60:2065) Avail: NTIS HC

A05/MF A01 CSCL 22B

ILLUMINATING, MIRRORS, SOLAR REFLECTORS

**N83-19806\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A MOBILE WORK STATION CONCEPT FOR MECHANICALLY AIDED ASTRONAUT ASSEMBLY OF LARGE SPACE TRUSSES**

W. L. HEARD, JR., H. G. BUSH, R. E. WALLSON (Kentrion International, Inc., Hampton, Va.), and J. K. JENSEN (Kentrion International, Inc., Hampton, Va.) Mar. 1983 36 p refs

(NASA-TP-2108; L-15523; NAS 1.60:2108) Avail: NTIS HC

A03/MF A01 CSCL 22B

BUOYANCY, EXTRAVEHICULAR MOBILITY UNITS, LARGE SPACE STRUCTURES, TRUSSES, WEIGHTLESSNESS

**N83-22317\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **PERFORMANCE OF AN ABLATOR FOR SPACE SHUTTLE INORBIT REPAIR IN AN ARC-PLASMA AIRSTREAM**

D. A. STEWART, M. CUELLAR (San Jose State Univ.), and O. FLOWERS Apr. 1983 18 p refs

(NASA-TP-2150; A-9112; NAS 1.60:2150) Avail: NTIS HC

A02/MF A01 CSCL 22B

AEROSPACE ENVIRONMENTS, ATMOSPHERIC ENTRY, CAULKING, SPACE SHUTTLES, TECHNOLOGY ASSESSMENT, THERMAL PROTECTION

**N83-31713\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ANALYSIS OF GAP HEATING DUE TO STEPPED TILES IN THE SHUTTLE THERMAL PROTECTION SYSTEM**

D. H. PETLEY, D. M. SMITH, C. L. W. EDWARDS, and A. B. CARLSON Aug. 1983 100 p refs

(NASA-TP-2209; L-15636; NAS 1.60:2209) Avail: NTIS HC

A05/MF A01 CSCL 22B

CERAMICS, CHANNEL FLOW, CORRELATION, GAPS, INCOMPRESSIBLE FLOW, SPACE SHUTTLE ORBITERS

**N84-16247\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **RADIATING DIPOLE MODEL OF INTERFERENCE INDUCED IN SPACECRAFT CIRCUITRY BY SURFACE DISCHARGES**

R. N. METZ (Colby College) Jan. 1984 7 p refs

(NASA-TP-2240; E-1775; NAS 1.60:2240) Avail: NTIS HC

A02/MF A01 CSCL 22B

COUPLING, ELECTRIC DIPOLES, ELECTRIC FIELDS, HIGH VOLTAGES, SPACE PLASMAS, SPACECRAFT CHARGING

**N84-19393\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STEADY INTERNAL FLOW AND AERODYNAMIC LOADS ANALYSIS OF SHUTTLE THERMAL PROTECTION SYSTEM**

D. H. PETLEY, W. ALEXANDER, JR., G. W. IVEY, JR., and P. A. KERR Mar. 1984 68 p refs

(NASA-TP-2255; L-15695; NAS 1.60:2255) Avail: NTIS HC

A04/MF A01 CSCL 22B

SPACE SHUTTLES, STEADY FLOW, THERMAL PROTECTION

**N84-23675\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **DECOUPLED CONTROL ANALYSIS OF A LARGE FLEXIBLE SPACE ANTENNA WITH LINEAR QUADRATIC REGULATOR COMPARISONS**

J. W. YOUNG, H. A. HAMER, and K. G. JOHNSON May 1984 82 p

(NASA-TP-2293; L-15696; NAS 1.60:2293) Avail: NTIS HC

A05/MF A01 CSCL 22B

DECOUPLING, FEEDBACK CONTROL, FLEXIBILITY, LARGE SPACE STRUCTURES, OPTIMAL CONTROL, ROTATION, SPACECRAFT ANTENNAS, THREE AXIS STABILIZATION, TRANSLATIONAL MOTION

**N84-23676\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **SHOCK RESPONSE SPECTRA VARIATIONAL ANALYSIS FOR PYROTECHNIC QUALIFICATION TESTING OF FLIGHT HARDWARE**

J. L. SMITH May 1984 15 p refs

(NASA-TP-2315; NAS 1.60:2315) Avail: NTIS HC A02/MF A01

CSCL 22B

ELECTRONIC EQUIPMENT, FLIGHT INSTRUMENTS, LOADS (FORCES), PYROTECHNICS, SHOCK SPECTRA, SHOCK TESTS

**N84-23677\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **AUTOMATED RENDEZVOUS AND DOCKING: A PARAMETRIC STUDY**

R. DABNEY May 1984 34 p refs

(NASA-TP-2314; NAS 1.60:2314) Avail: NTIS HC A03/MF A01

CSCL 22B

APPROACH CONTROL, COMPUTERIZED SIMULATION, GUIDANCE (MOTION), IMAGE PROCESSING, PERFORMANCE PREDICTION, SPACECRAFT DOCKING, VISUAL CONTROL

**N84-33452\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **DESIGN GUIDELINES FOR ASSESSING AND CONTROLLING SPACECRAFT CHARGING EFFECTS**

C. K. PURVIS, H. B. GARRETT (JPL), A. C. WHITTLESEY (JPL), and N. J. STEVENS (Hughes Aircraft Co., El Segundo, Calif.) Sep. 1984 48 p refs

(NASA-TP-2361; E-2073; NAS 1.60:2361) Avail: NTIS HC

A03/MF A01 CSCL 22B

ELECTROMAGNETIC COMPATIBILITY, ELECTROMAGNETIC PULSES, GEOSYNCHRONOUS ORBITS, SPACECRAFT CHARGING, SPACECRAFT DESIGN

**N84-34468\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **THIRTEENTH SPACE SIMULATION CONFERENCE. THE PAYLOAD: TESTING FOR SUCCESS**

J. STECHER, ed. Washington 1984 283 p refs Conf. held in Orlando, Fla., 8-11 Oct. 1984 Sponsored in cooperation with Inst. of Environmental Sciences, AIAA, and the American Society for Testing and Materials

(NASA-CP-2340; NAS 1.55:2340) Avail: NTIS HC A13/MF A01 CSCL 22A

COMPUTERIZED SIMULATION, CONTAMINATION, DYNAMIC CONTROL, DYNAMIC TESTS, SPACE SIMULATORS, SYSTEMS SIMULATION, THERMAL ENVIRONMENTS

**N85-11127\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **SPACE SHUTTLE WIND TUNNEL TESTING PROGRAM**

A. M. WHITNAH and E. R. HILLJE Nov. 1984 492 p refs

(NASA-RP-1125; S-535; NAS 1.61:1125) Avail: NTIS HC

A21/MF A01 CSCL 22B

A major phase of the Space Shuttle Vehicle (SSV) Development Program was the acquisition of data through the space shuttle wind tunnel testing program. It became obvious that the large number of configuration/environment combinations would

necessitate an extremely large wind tunnel testing program. To make the most efficient use of available test facilities and to assist the prime contractor for orbiter design and space shuttle vehicle integration, a unique management plan was devised for the design and development phase. The space shuttle program is reviewed together with the evolutionary development of the shuttle configuration. The wind tunnel testing rationale and the associated test program management plan and its overall results is reviewed. Information is given for the various facilities and models used within this program. A unique posttest documentation procedure and a summary of the types of test per disciplines, per facility, and per model are presented with detailed listing of the posttest documentation. E.A.K.

**N85-14858\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**CIRCUIT TRANSIENTS DUE TO NEGATIVE BIAS ARCS ON A HIGH-VOLTAGE SOLAR ARRAY IN LOW EARTH ORBIT**  
 R. N. METZ (Colby Coll., Waterville, Maine) Jan. 1985 12 p refs  
 (NASA-TP-2407; E-2239; NAS 1.60:2407) Avail: NTIS HC A02/MF A01 CSCL 22B

AURORAL ARCS, BIAS, CIRCUIT PROTECTION, HIGH VOLTAGES, NEGATIVE CONDUCTANCE, SOLAR ARRAYS, SURGES

**N85-19015\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SWING-ARM BEAM ERECTOR (SABER) CONCEPT FOR SINGLE ASTRONAUT ASSEMBLY OF SPACE STRUCTURE**  
 J. J. WATSON, W. L. HEARD, JR., and J. K. JENSEN (Kentron International, Inc.) Mar. 1985 32 p refs  
 (NASA-TP-2379; L-15886; NAS 1.60:2379) Avail: NTIS HC A03/MF A01 CSCL 22B

BEAMS (SUPPORTS), EXTRAVEHICULAR MOBILITY UNITS, LARGE SPACE STRUCTURES, MECHANICAL DEVICES, ORBITAL ASSEMBLY

**N85-22470\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**SPACECRAFT ENVIRONMENTAL INTERACTIONS TECHNOLOGY, 1983**  
 Washington Mar. 1985 673 p refs Conf. held in Colorado Springs, 4-6 Oct. 1983 Prepared in cooperation with AFGL, Hanscom AFB, Mass.  
 (NASA-CP-2359; E-2186; NAS 1.55:2359; AFGL-TR-85-0018) Avail: NTIS HC A99/MF E03 CSCL 22B

CONFERENCES, EARTH ORBITS, ELECTRODYNAMICS, HIGH VOLTAGES, PLASMA INTERACTIONS, SPACE SHUTTLES, SPACECRAFT CHARGING

**N85-31141\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**RECOVERY OF PYROSHOCK DATA FROM DISTORTED ACCELERATION RECORDS**  
 J. L. SMITH Washington Jul. 1985 20 p  
 (NASA-TP-2494; NAS 1.60:2494) Avail: NTIS HC A02/MF A01 CSCL 22B

ACCELERATION (PHYSICS), HIGH FREQUENCIES, MECHANICAL SHOCK, SHOCK SPECTRA, SIGNAL DISTORTION

**N85-31142\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**ADAPTIVE IDENTIFICATION AND CONTROL OF STRUCTURAL DYNAMICS SYSTEMS USING RECURSIVE LATTICE FILTERS**  
 N. SUNDARARAJAN (Indian Space Research Organization), R. C. MONTGOMERY, and J. P. WILLIAMS Jan. 1985 51 p refs  
 (NASA-TP-2371; L-15737; NAS 1.60:2371) Avail: NTIS HC A04/MF A01 CSCL 22B

ADAPTIVE CONTROL, DYNAMIC STRUCTURAL ANALYSIS, LATTICES (MATHEMATICS), LEAST SQUARES METHOD, SIGNAL PROCESSING

**N86-16250\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DECOUPLED AND LINEAR QUADRATIC REGULATOR CONTROL OF A LARGE, FLEXIBLE SPACE ANTENNA WITH AN OBSERVER IN THE CONTROL LOOP**

H. A. HAMER, K. G. JOHNSON, and J. W. YOUNG Nov. 1985 74 p refs

(NASA-TP-2484; L-15913; NAS 1.60:2484) Avail: NTIS HC

A04/MF A01 CSCL 22B

ANTENNAS, CONTROL MOMENT GYROSCOPES, DECOUPLING, LARGE SPACE STRUCTURES, LINEARITY, QUADRATIC EQUATIONS, RIGID STRUCTURES

**N86-30800\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPLICATION OF THE LQG/LTR TECHNIQUE TO ROBUST CONTROLLER SYNTHESIS FOR A LARGE FLEXIBLE SPACE ANTENNA**

S. M. JOSHI, E. S. ARMSTRONG, and N. SUNDARARAJAN (Old Dominion Univ., Norfolk, Va.) Sep. 1986 64 p

(NASA-TP-2560; L-16076; NAS 1.60:2560) Avail: NTIS HC

A04/MF A01 CSCL 22B

ANTENNAS, FLEXIBLE SPACECRAFT, HOOP COLUMN ANTENNAS, LARGE SPACE STRUCTURES, SPACECRAFT CONTROL

**N86-30801\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF MODEL ERROR ON CONTROL OF LARGE FLEXIBLE SPACE ANTENNA WITH COMPARISONS OF DECOUPLED AND LINEAR QUADRATIC REGULATOR CONTROL PROCEDURES**

H. A. HAMER and K. G. JOHNSON Sep. 1986 52 p

(NASA-TP-2604; L-16114; NAS 1.60:2604) Avail: NTIS HC

A04/MF A01 CSCL 22B

ANTENNAS, CONTROL MOMENT GYROSCOPES, CONTROL SYSTEMS DESIGN, ERRORS, FLEXIBLE BODIES, HOOP COLUMN ANTENNAS, LARGE SPACE STRUCTURES, MATHEMATICAL MODELS, VIBRATION DAMPING

## 19

## SPACECRAFT INSTRUMENTATION

**N78-17145\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DESIGN AND FABRICATION OF A LOW-SPECIFIC-WEIGHT PARABOLIC DISH SOLAR CONCENTRATOR**

C. W. RICHTER, A. G. BIRCHENOUGH, G. A. MARQUIS, and T. S. MROZ Jan. 1978 18 p refs

(NASA-TP-1152; E-9339) Avail: NTIS HC A02/MF A01 CSCL 10A

CONCENTRATORS, FABRICATION, PARABOLIC REFLECTORS, SOLAR REFLECTORS

**N80-13152\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHT TECHNOLOGY IMPROVEMENT**

Dec. 1979 76 p Proceedings of workshop held at College Park, Md., 31 Jul. - 2 Aug. 1979

(NASA-CP-2101; L-13259) Avail: NTIS HC A05/MF A01

CSCL 22B

CONFERENCES, ELECTROMECHANICAL DEVICES, RADIOMETERS, SATELLITE ATTITUDE CONTROL, SPACECRAFT INSTRUMENTS, SPACECRAFT POWER SUPPLIES

## 19 SPACECRAFT INSTRUMENTATION

**N80-28424\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE TIME-SPACE RELATIONSHIP OF THE DATA POINT (PIXELS) OF THE THEMATIC MAPPER AND MULTISPECTRAL SCANNER OR THE MYTH OF SIMULTANEITY**

F. GORDON, JR. Jul. 1980 29 p refs  
(NASA-TP-1715; REPT-80F5121) Avail: NTIS HC A03/MF A01  
CSCL 14B

DATA PROCESSING, IMAGING TECHNIQUES, MULTISPECTRAL BAND SCANNERS, SATELLITE OBSERVATION, SPACE-TIME FUNCTIONS, THEMATIC MAPPING

**N80-33463\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HIGH SPEED LOOKUP TABLE APPROACH TO RADIOMETRIC CALIBRATION OF MULTISPECTRAL IMAGE DATA**

W. L. KELLY, IV, B. D. MEREDITH, and W. M. HOWLE  
Washington Oct. 1980 16 p  
(NASA-TP-1741; L-13893) Avail: NTIS HC A02/MF A01  
CSCL 14B

DATA PROCESSING, IMAGE PROCESSING, MICROPROCESSORS, MULTISPECTRAL PHOTOGRAPHY, ONBOARD DATA PROCESSING, RADIOMETERS

**N81-16119\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SPACECRAFT TRANSMITTER RELIABILITY**

1980 18 p refs Synopsis of Workshop, held in Cleveland, 25-26 Sep. 1979; sponsored by NASA and Air Force  
(NASA-CP-2159; E-662) Avail: NTIS HC A06/MF A01  
CSCL 17B

CATHODES, EQUIPMENT SPECIFICATIONS, QUALITY CONTROL, TRANSMITTERS, TRAVELING WAVE TUBES

**N81-31281\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PROTON-INDUCED NOISE IN DIGICONS**

L. C. SMITH (Old Dominion Univ., Norfolk, Va.), J. BECHER (Old Dominion Univ., Norfolk, Va.), W. B. FOWLER, and K. FLEMMING  
Aug. 1981 33 p refs  
(NASA-TP-1852; REPT-81F0051) Avail: NTIS HC A03/MF A01  
CSCL 09F

NOISE SPECTRA, PROTON IRRADIATION, RADIATION BELTS, REMOTE SENSING, TELESCOPES

**N81-31282\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DEVELOPMENT AND DESIGN OF THREE MONITORING INSTRUMENTS FOR SPACECRAFT CHARGING**

J. C. STURMAN Sep. 1981 28 p refs  
(NASA-TP-1800; E-603) Avail: NTIS HC A03/MF A01  
CSCL 22B

ELECTROSTATIC PROBES, MAGNETIC STORMS, POTENTIOMETERS (INSTRUMENTS), SPACECRAFT CHARGING, SYSTEM GENERATED ELECTROMAGNETIC PULSES

**N83-15348\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**ADVANCED AUTOMATION FOR SPACE MISSIONS Final Report**

R. A. FREITAS, JR., ed. (Santa Clara Univ.) and W. P. GILBREATH, ed. Nov. 1982 392 p refs Meeting held in Santa Clara, Calif., 23 Jun. - 29 Aug. 1980; sponsored in cooperation with Am. Soc. for Eng. Education Original contains color illustrations  
(NASA-CP-2255; A-8618; NAS 1.55:2255) Avail: NTIS HC A17/MF A01  
CSCL 22B

ARTIFICIAL INTELLIGENCE, AUTOMATIC CONTROL, CONFERENCES, ROBOTS, SPACE EXPLORATION, SPACE MANUFACTURING, SPACE MISSIONS

**N85-30005\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**SUBMILLIMETER LOCAL OSCILLATORS FOR SPACEBORNE HETERODYNE APPLICATIONS**

S. J. PETUCHOWSKI and J. DURACHTA Washington Jun. 1985 63 p refs Prepared in cooperation with Maryland Univ., College Park

(NASA-RP-1147; NAS 1.61:1147; REPT-85B0310) Avail: NTIS HC A04/MF A01  
CSCL 09A

Existing and prospective submillimeter local oscillator technologies are surveyed and compared with respect to criteria of suitability for application in spaceborne submillimeter heterodyne receivers as those proposed for the Large Deployable Reflector (LDR). Solid-state and plasma devices are considered in terms of fundamental limitations.  
Author

**N86-19349\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SOLAR TERRESTRIAL OBSERVATORY SPACE STATION WORKSHOP REPORT**

W. T. ROBERTS, ed. Washington Jan. 1986 41 p refs  
Workshop held in Huntsville, Ala., 6 Jun. 1985  
(NASA-CP-2411; M-505; NAS 1.55:2411) Avail: NTIS HC A03/MF A01  
CSCL 14B

CONFERENCES, ORBITAL SERVICING, SOLAR OBSERVATORIES, SOLAR PHYSICS, SOLAR TERRESTRIAL INTERACTIONS, SPACE PLATFORMS, SPACE STATIONS, SPACECRAFT INSTRUMENTS

## 20

### SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

**N77-32229\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE ATS-6 POWER SYSTEM: HARDWARE IMPLEMENTATION AND ORBITAL PERFORMANCE**

T. A. LAVIGNA and F. L. HORNBuckle Sep. 1977 49 p refs  
(NASA-TP-1023; G-7703-X10) Avail: NTIS HC A03/MF A01  
CSCL 10C

ATS 6, SPACECRAFT POWER SUPPLIES

**N78-13124\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**HYDROGEN FILM COOLING OF A SMALL HYDROGEN-OXYGEN THRUST CHAMBER AND ITS EFFECT ON EROSION RATES OF VARIOUS ABLATIVE MATERIALS**

N. HANNUM, W. E. ROBERTS, and L. M. RUSSELL Dec. 1977 27 p refs  
(NASA-TP-1098; E-8909) Avail: NTIS HC A03/MF A01  
CSCL 21H

ABLATIVE MATERIALS, EROSION, FILM COOLING, HYDROGEN OXYGEN ENGINES, THRUST CHAMBERS

**N79-10122\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FUTURE ORBITAL POWER SYSTEMS TECHNOLOGY REQUIREMENTS**

Sep. 1978 195 p refs Symp. held at Cleveland, 31 May - 1 Jun. 1978  
(NASA-CP-2058; E-9713) Avail: NTIS HC A09/MF A01  
CSCL 10A

CONFERENCES, ELECTRIC GENERATORS, SPACECRAFT POWER SUPPLIES, TECHNOLOGY ASSESSMENT



**N79-23132\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF LOW-STIFFNESS CLOSEOUT OVERWRAP ON ROCKET THRUST-CHAMBER LIFE**

H. J. KASPER and J. J. NOTA-DONATO May 1979 33 p refs  
(NASA-TP-1456; E-9870) Avail: NTIS HC A03/MF A01 CSCL 21H

COMPOSITE WRAPPING, COPPER, FATIGUE LIFE, ROCKET LININGS, THRUST CHAMBERS

**N80-16095\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**SEALED-CELL NICKEL-CADMIUM BATTERY APPLICATIONS MANUAL**

W. R. SCOTT and D. W. RUSTA Dec. 1979 533 p refs  
(NAS5-23514)

(NASA-RP-1052) Avail: NTIS HC A23/MF A01 CSCL 10B

The design, procurement, testing, and application of aerospace quality, hermetically sealed nickel-cadmium cells and batteries are presented. Cell technology, cell and battery development, and spacecraft applications are emphasized. Long term performance is discussed in terms of the effect of initial design, process, and application variables. Design guidelines and practices are given.

M.G.

**N80-31449\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LARGE SPACE SYSTEMS/LOW-THRUST PROPULSION TECHNOLOGY**

Jul. 1980 347 p refs Meeting held at Cleveland, 20-21 May 1980

(NASA-CP-2144; E-510) Avail: NTIS HC A15/MF A01 CSCL 21H

CONFERENCES, LARGE SPACE STRUCTURES, LOW THRUST PROPULSION, PROULSION SYSTEM CONFIGURATIONS, SPACE TRANSPORTATION SYSTEM, SPACECRAFT PROPULSION

**N80-33465\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SYNCHRONOUS ENERGY TECHNOLOGY**

Sep. 1980 144 p Symp. held in Cleveland, 29-30 Apr. 1980  
(NASA-CP-2154; E-469) Avail: NTIS HC A07/MF A01 CSCL 21H

CONFERENCES, GEOSYNCHRONOUS ORBITS, POWER EFFICIENCY, SPACECRAFT POWER SUPPLIES

**N81-20173\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYSIS OF COSTS OF GALLIUM ARSENIDE AND SILICON SOLAR ARRAYS FOR SPACE POWER APPLICATIONS**

K. S. JEFFERIES Mar. 1981 16 p refs

(NASA-TP-1811; E-536) Avail: NTIS HC A02/MF A01 CSCL 10A

COST ANALYSIS, EARTH ORBITS, ELECTRIC PROPULSION, GALLIUM ARSENIDES, SATELLITE SOLAR ENERGY CONVERSION, SILICON, SOLAR CELLS

**N81-20176\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SOME EFFECTS OF THERMAL-CYCLE-INDUCED DEFORMATION IN ROCKET THRUST CHAMBERS**

N. P. HANNUM and R. G. PRICE, JR. Apr. 1981 24 p refs  
(NASA-TP-1834; E-553) Avail: NTIS HC A02/MF A01 CSCL 21H

DEFORMATION, FAILURE ANALYSIS, THERMAL FATIGUE, THRUST CHAMBERS

**N81-24167\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**LIFE TEST OF A NICKEL CADMIUM BATTERY WITH A PROTECTION/RECONDITIONING CIRCUIT**

J. R. LANIER, JR. and J. R. BUSH, JR. May 1981 19 p refs  
(NASA-TP-1873; M-350) Avail: NTIS HC A02/MF A01 CSCL 10C

EARTH ORBITS, ELECTRIC DISCHARGES, LIFE CYCLE COSTS, NICKEL CADMIUM BATTERIES

**N81-33231\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Structures and Propulsion Lab.

**FEASIBILITY STUDY OF LITVC FOR SHUTTLE SRB**

C. L. MARTIN and L. B. POWERS Sep. 1981 19 p refs  
(NASA-TP-1912; M-354) Avail: NTIS HC A02/MF A01 CSCL 21H

BOOSTER ROCKET ENGINES, INJECTORS, LIQUID INJECTION, SPACE SHUTTLE BOOSTERS, THRUST VECTOR CONTROL

**N82-11109\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**CONCEPT FOR A POWER SYSTEM CONTROLLER FOR LARGE SPACE ELECTRICAL POWER SYSTEMS**

L. F. LOLLAR, J. R. LANIER, JR., and J. R. GRAVES Nov. 1981 15 p refs

(NASA-TP-1939) Avail: NTIS HC A02/MF A01 CSCL 22B

AUTOMATIC CONTROL, CENTRAL PROCESSING UNITS, ELECTRIC NETWORKS, NETWORK CONTROL, POWER MODULES (STS)

**N82-21254\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SPACE POWER SUBSYSTEM AUTOMATION TECHNOLOGY**

J. R. GRAVES, comp. Mar. 1982 219 p Proc. of a Conf./Workshop held at Marshall Space Flight Center, Ala., 28-29 Oct. 1981

(NASA-CP-2213; M-371; NAS 1.55:2213) Avail: NTIS HC A10/MF A01 CSCL 22B

AUTOMATIC CONTROL, CONFERENCES, ELECTRIC POWER SUPPLIES, SPACECRAFT POWER SUPPLIES

**N83-24549\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**PERFECT BELL NOZZLE PARAMETRIC AND OPTIMIZATION CURVES**

J. L. TUTTLE and D. H. BLOUNT May 1983 32 p refs

(NASA-RP-1104; NAS 1.61:1104) Avail: NTIS HC A03/MF A01 CSCL 21H

Nozzle contour data for untruncated Bell nozzles with expansion area ratios to 6100 and a specific heat ratio of 1.2 are provided. Curves for optimization of nozzles for maximum thrust coefficient within a given length, surface area, or area ratio are included. The nozzles are two dimensional axisymmetric and calculations were performed using the method of characteristics. Drag due to wall friction was included in the final thrust coefficient. Author

**N84-12228\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTEGRATED FLYWHEEL TECHNOLOGY, 1983**

C. R. KECKLER, ed., G. E. RODRIGUEZ, ed. (NASA. Goddard Space Flight Center), and N. J. GROOM, ed. Washington Dec. 1983 205 p refs Workshop held in Greenbelt, Md., 2-3 Aug. 1983

(NASA-CP-2290; L-15707; NAS 1.55:2290) Avail: NTIS HC A10/MF A01 CSCL 10C

ATTITUDE CONTROL, CONFERENCES, FLYWHEELS, SPACE STATIONS, SYSTEMS INTEGRATION

## 20 SPACECRAFT PROPULSION AND POWER

**N85-13850\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AN ASSESSMENT OF INTEGRATED FLYWHEEL SYSTEM TECHNOLOGY**

C. R. KECKLER, ed., R. T. BECHTEL, ed. (NASA. Marshall Space Flight Center), and N. J. GROOM, ed. Washington Nov. 1984 419 p refs Workshop held in Huntsville, Ala., 7-9 Feb. 1984 (NASA-CP-2346; L-15876; NAS 1.55:2346) Avail: NTIS HC A18/MF A01 CSCL 10B

ATTITUDE CONTROL, CONFERENCES, ENERGY STORAGE, FLYWHEELS, INTEGRATED ENERGY SYSTEMS, POWER CONDITIONING

**N85-13880\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SPACE POWER**

Washington Apr. 1984 322 p refs Workshop held in Cleveland, 10-12 Apr. 1984

(NASA-CP-2352; E-2305; NAS 1.55:2352) Avail: NTIS HC

A14/MF A01 CSCL 22B

CONFERENCES, SPACE STATIONS, SPACECRAFT POWER SUPPLIES

**N85-21263\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **HIGH-VOLTAGE, HIGH-POWER, SOLID-STATE REMOTE POWER CONTROLLERS FOR AEROSPACE APPLICATIONS**

J. C. STURMAN Mar. 1985 34 p refs

(NASA-TP-2437; E-2359; NAS 1.60:2437) Avail: NTIS HC

A03/MF A01 CSCL 10B

CIRCUIT BREAKERS, ELECTRIC SWITCHES, FIELD EFFECT TRANSISTORS, POWER SUPPLY CIRCUITS, SPACECRAFT EQUIPMENT, THYRISTORS

**N85-26862\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **ADVANCED HIGH PRESSURE O<sub>2</sub>/H<sub>2</sub> TECHNOLOGY**

S. F. MOREA, ed. and S. T. WU, ed. (Alabama Univ., Huntsville) Washington Apr. 1985 753 p refs Conf. held in Huntsville, Ala., 27-29 Jun. 1984

(NASA-CP-2372; NAS 1.55:2372) Avail: NTIS HC A99/MF E03; SOD HC CSCL 21H

COMBUSTION CHAMBERS, CONFERENCES, ENGINE MONITORING INSTRUMENTS, ENGINE PARTS, HYDROGEN OXYGEN ENGINES, SPACE SHUTTLE MAIN ENGINE, TURBINE BLADES, TURBINE PUMPS

**N85-27941\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **STRUCTURAL INTEGRITY AND DURABILITY OF REUSABLE SPACE PROPULSION SYSTEMS**

Washington May 1985 191 p refs Conf. held in Cleveland, Ohio, 4-5 Jun. 1985; sponsored by NASA, Washington and NASA. Lewis Research Center

(NASA-CP-2381; E-2554; NAS 1.55:2381) Avail: NTIS HC

A09/MF A01 CSCL 21H

AEROTHERMODYNAMICS, CONFERENCES, FATIGUE (MATERIALS), FRACTURING, LOADS (FORCES), NONDESTRUCTIVE TESTS, REUSABLE ROCKET ENGINES, SPACE SHUTTLE MAIN ENGINE, SPACECRAFT PROPULSION

**N86-21577\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **TECHNOLOGY FOR BAYTON-CYCLE POWERPLANTS USING SOLAR AND NUCLEAR ENERGY**

R. E. ENGLISH Feb. 1986 15 p refs

(NASA-TP-2558; E-2761; NAS 1.60:2558) Avail: NTIS HC

A02/MF A01 CSCL 10B

BRAYTON CYCLE, ELECTRIC GENERATORS, GAS TURBINE ENGINES, NUCLEAR PROPULSION, SOLAR ENERGY

**N86-28123\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **RAIL ACCELERATORS FOR SPACE TRANSPORTATION: AN EXPERIMENTAL INVESTIGATION**

L. M. ZANA, W. R. KERSLAKE, and J. L. STURMAN May 1986 37 p

(NASA-TP-2571; E-2754; NAS 1.60:2571) Avail: NTIS HC

A03/MF A01 CSCL 09C

ELECTROMAGNETIC ACCELERATION, HYPERVELOCITY LAUNCHERS, PLASMA PROPULSION, PROPULSION SYSTEM CONFIGURATIONS, RAILGUN ACCELERATORS, SPACE TRANSPORTATION

**N86-28124\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **CURRENT EVALUATION OF THE TRIPROPELLANT CONCEPT**

R. L. ZURAWSKI Jun. 1986 30 p Presented at the AIAA/SAI/ASME/ASEE 22nd Joint Propulsion Conference, Huntsville, Ala., 16-18 Jun. 1986

(NASA-TP-2602; E-2863; NAS 1.60:2602) Avail: NTIS HC

A03/MF A01 CSCL 21I

ADDITIVES, HIGH ENERGY PROPELLANTS, LIQUID ROCKET PROPELLANTS, METAL PROPELLANTS, METALS, SPECIFIC IMPULSE

## 23

## CHEMISTRY AND MATERIALS (GENERAL)

**N78-21216\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **FORMULATION OF ELECTRICALLY CONDUCTIVE THERMAL-CONTROL COATINGS**

M. C. SHAI Apr. 1978 19 p refs

(NASA-TP-1218; G-97802-F9) Avail: NTIS HC A02/MF A01

CSCL 11D

ALUMINUM OXIDES, ELECTRIC CONDUCTORS, PIGMENTS, THERMAL CONTROL COATINGS, ZINC OXIDES

**N79-21128\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **THREE METHODS FOR IN SITU CROSS-LINKING OF POLYVINYL ALCOHOL FILMS FOR APPLICATION AS ION-CONDUCTING MEMBRANES IN POTASSIUM HYDROXIDE ELECTROLYTE**

W. H. PHILIPP and L. C. HSU Apr. 1979 18 p refs

(NASA-TP-1407; E-9778) Avail: NTIS HC A02/MF A01 CSCL

07D

CROSSLINKING, ION EXCHANGE MEMBRANE ELECTROLYTES, POLYMERIC FILMS, POLYVINYL ALCOHOL, POTASSIUM HYDROXIDES, SEPARATORS

**N79-22194\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **IMPROVED ADHERENCE OF SPUTTERED TITANIUM CARBIDE COATINGS ON NICKEL- AND TITANIUM-BASE ALLOYS**

D. R. WHEELER and W. A. BRAINARD Apr. 1979 18 p refs

(NASA-TP-1450; E-9838) Avail: NTIS HC A02/MF A01 CSCL

11F

ADHESION, RENE 41, SPUTTERING, SURFACE FINISHING, TITANIUM ALLOYS, TITANIUM CARBIDES

**N79-31346\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SURFACE CHEMISTRY OF IRON SLIDING IN AIR AND NITROGEN LUBRICATED WITH HEXADECANE AND HEXADECANE CONTAINING DIBENZYL-DISULFIDE**

D. R. WHEELER Sep. 1979 15 p refs  
(NASA-TP-1545; E-9956) Avail: NTIS HC A02/MF A01 CSCL 11G

FRICTION REDUCTION, IRON, NITROGEN, OXYGEN, SLIDING FRICTION, SURFACE REACTIONS, WEAR, WEAR TESTS

**N83-12147\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ADVANCED MATERIALS TECHNOLOGY**

C. P. BLANKENSHIP, comp. and L. A. TEICHMAN, comp. Nov. 1982 438 p refs Proc. held at Hampton, Va., 16-17 Nov. 1982 Sponsored in cooperation with AIAA  
(NASA-CP-2251; L-15537; NAS 1.55:2251) Avail: NTIS HC A19/MF A01 CSCL 11G

AIRCRAFT CONSTRUCTION MATERIALS, AIRCRAFT STRUCTURES, ALUMINUM ALLOYS, CONFERENCES, FATIGUE LIFE, MATRIX MATERIALS, POWDER METALLURGY

**N83-24556\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**THE 1ST SYMPOSIUM ON CHEMICAL EVOLUTION AND THE ORIGIN AND EVOLUTION OF LIFE**

D. L. DEVINCENZI, ed. and L. G. PLEASANT, ed. 1982 119 p Symp. held at Ames Research Center, Calif., 2-4 Aug. 1982  
(NASA-CP-2276; NAS 1.55:2276) Avail: NTIS HC A06/MF A01 CSCL 06C

BIOLOGICAL EVOLUTION, CHEMICAL EVOLUTION, CONFERENCES, EXOBIOLGY, EXTRATERRESTRIAL LIFE, GEOLOGY, PLANETARY ENVIRONMENTS, SPACE EXPLORATION

**N84-20643\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**HOMOGENEOUS REACTIONS OF HYDROCARBONS, SILANE, AND CHLOROSILANES IN RADIOFREQUENCY PLASMAS AT LOW PRESSURES**

R. AVNI, U. CARMI (Nuclear Research Center Negev, Beer Sheva, Israel), A. INSPEKTOR (Nuclear Research Center Negev, Beer Sheva, Israel), and I. ROSENTHAL (Nuclear Research Center Negev, Beer Sheva, Israel) Apr. 1984 13 p refs Presented at the 6th Intern. Symp. on Plasma Chem., Montreal, 24-28 Jul. 1983; sponsored by International Union of Pure and Applied Chemistry  
(NASA-TP-2301; E-1919; NAS 1.60:2301) Avail: NTIS HC A02/MF A01 CSCL 07A

DISSOCIATION, HYDROCARBONS, PLASMA JETS, SILANES

**N84-26749\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MICROSTRUCTURE AND ORIENTATION EFFECTS ON PROPERTIES OF DISCONTINUOUS SILICON CARBIDE/ALUMINUM COMPOSITES**

D. L. MCDANELS and C. A. HOFFMAN Jul. 1984 32 p refs  
(NASA-TP-2302; E-1977; NAS 1.60:2302) Avail: NTIS HC A03/MF A01 CSCL 11D

ALUMINUM ALLOYS, MECHANICAL PROPERTIES, METAL MATRIX COMPOSITES, MICROSTRUCTURE, SILICON CARBIDES, WHISKER COMPOSITES

**N86-11227\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**WELDING, BONDING AND FASTENING, 1984**

J. D. BUCKLEY, ed. and B. A. STEIN, ed. Washington Sep. 1985 484 p refs Conf. held in Hampton, Va., 23-25 Oct. 1984; sponsored by NASA, American Society for Metals, George Washington Univ., American Welding Society, and Society of Mfg. Engineers  
(NASA-CP-2387; L-16023; NAS 1.55:2387) Avail: NTIS HC A21/MF A01 CSCL 13H

CONFERENCES, FASTENERS, METAL-METAL BONDING, SOLDERING, WELDING

## 24

## COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

**N78-11200\*#** National Bureau of Standards, Boulder, Colo.

**CRYOGENIC FOAM INSULATION: ABSTRACTED PUBLICATIONS**

F. R. WILLIAMSON NASA Sep. 1977 171 p refs Sponsored by NASA  
(NASA-RP-1002) Avail: NTIS HC A08/MF A01 CSCL 11D

A group of documents were chosen and abstracted which contain information on the properties of foam materials and on the use of foams as thermal insulation at cryogenic temperatures. The properties include thermal properties, mechanical properties, and compatibility properties with oxygen and other cryogenic fluids. Uses of foams include applications as thermal insulation for spacecraft propellant tanks, and for liquefied natural gas storage tanks and pipelines. Author

**N78-13138\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MECHANICAL BEHAVIOR AND FRACTURE CHARACTERISTICS OF OFF-AXIS FIBER COMPOSITES. 1: EXPERIMENTAL INVESTIGATION**

J. H. SINCLAIR and C. C. CHAMIS Dec. 1977 36 p refs  
(NASA-TP-1081; E-9085) Avail: NTIS HC A03/MF A01 CSCL 11D

COMPOSITE MATERIALS, FRACTURE MECHANICS, GRAPHITE-EPOXY COMPOSITES

**N78-16098\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MECHANICAL BEHAVIOR AND FRACTURE CHARACTERISTICS OF OFF-AXIS FIBER COMPOSITES. 2: THEORY AND COMPARISONS**

C. C. CHAMIS and J. H. SINCLAIR Jan. 1978 29 p refs  
(NASA-TP-1082; E-9269) Avail: NTIS HC A03/MF A01 CSCL 11D

COMPARISON, FRACTURE STRENGTH, GRAPHITE-EPOXY COMPOSITES, MECHANICAL PROPERTIES

**N78-18135\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TENSILE STRESS-STRAIN BEHAVIOR OF BORON/ALUMINUM LAMINATES**

J. A. SOVA (Joint Inst. for Advan. of Flight Sci., Hampton, Va.) and C. C. POE, JR. Feb. 1978 65 p refs  
(NASA-TP-1117; L-11864) Avail: NTIS HC A04/MF A01 CSCL 11D

ALUMINUM, BORON, STRESS-STRAIN RELATIONSHIPS, TENSILE STRESS

## 24 COMPOSITE MATERIALS

**N78-20256\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EFFECTS OF FABRICATION AND JOINING PROCESSES ON COMPRESSIVE STRENGTH OF BORON/ALUMINUM AND BORSIC/ALUMINUM STRUCTURAL PANELS**

D. M. ROYSTER, H. R. WIAIT (Vought Corp., Hampton, Virginia), and R. R. MCWITHEY Apr. 1978 55 p refs  
(NASA-TP-1121; L-11728) Avail: NTIS HC A04/MF A01

CSCL 11D

ALUMINUM, BORON, COMPRESSIVE STRENGTH, FABRICATION, PANELS

**N79-22196\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **CARBON FIBER RISK ANALYSIS**

1979 245 p An Ind./Govt. briefing held at Hampton, Va., 31 Oct. 1978 - 1 Nov. 1978

(NASA-CP-2074; L-12723) Avail: NTIS HC A11/MF A01

CSCL 11D

CARBON FIBERS, CONFERENCES, GRAPHITE-EPOXY COMPOSITES, RISK

**N79-23140\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STRESS-CONCENTRATION FACTORS FOR FINITE ORTHOTROPIC LAMINATES WITH A CIRCULAR HOLE AND UNIAXIAL LOADING**

C. S. HONG and J. H. CREWS, JR. May 1979 29 p refs  
(NASA-TP-1469; L-12744) Avail: NTIS HC A03/MF A01

CSCL 11D

AXIAL STRAIN, COMPOSITE MATERIALS, ORTHOTROPIC PLATES, STRESS RATIO

**N79-23141\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EXPLORATORY INVESTIGATION OF TWO RESIN-MATRIX COMPOSITES SUBJECTED TO ARC-TUNNEL HEATING**

C. M. PITTMAN and R. D. BROWN May 1979 30 p refs  
(NASA-TP-1429; L-12665) Avail: NTIS HC A03/MF A01

CSCL 11D

ARC HEATING, GRAPHITE-EPOXY COMPOSITES, SPACE SHUTTLES, THERMAL DEGRADATION

**N79-28234\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **THERMAL-CONDUCTIVITY MEASUREMENTS OF TUNGSTEN-FIBER-REINFORCED SUPERALLOY COMPOSITES USING A THERMAL-CONDUCTIVITY COMPARATOR**

L. J. WESTFALL and E. A. WINSA Jul. 1979 23 p refs  
(NASA-TP-1445; E-9910) Avail: NTIS HC A02/MF A01 CSCL 11D

COMPARATORS, COMPOSITE MATERIALS, HEAT RESISTANT ALLOYS, REINFORCING FIBERS, THERMAL CONDUCTIVITY, TUNGSTEN

**N79-29241\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **MOISTURE DIFFUSION PARAMETER CHARACTERISTICS FOR EPOXY COMPOSITES AND NEAT RESINS**

E. R. LONG, JR. Aug. 1979 30 p refs  
(NASA-TP-1474; L-12629) Avail: NTIS HC A03/MF A01

CSCL 11D

DIFFUSION COEFFICIENT, EPOXY RESINS, GRAPHITE-EPOXY COMPOSITES, HYGROSCOPICITY, MOISTURE CONTENT

**N79-30297\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **GRAPHITE/POLYIMIDE COMPOSITES**

H. B. DEXTER, ed. and J. G. DAVIS, JR., ed. Aug. 1979 449 p refs Proc. held at Hampton, Va., 28 Feb. - 1 Mar. 1979

(NASA-CP-2079; L-12953) Avail: NTIS HC A19/MF A01

CSCL 11D

ADHESIVE BONDING, ADHESIVES, CARBON FIBER REINFORCED PLASTICS, CONFERENCES, POLYIMIDE RESINS, POLYIMIDES, POLYMER MATRIX COMPOSITES, SPACE TRANSPORTATION SYSTEM

**N79-32277\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ELEVATED-TEMPERATURE APPLICATION OF THE IITRI COMPRESSION TEST FIXTURE FOR GRAPHITE/POLYIMIDE FILAMENTARY COMPOSITES**

B. B. RAJU, C. J. CAMARDA, and P. A. COOPER Washington Sep. 1979 48 p refs

(NASA-TP-1496; L-12704) Avail: NTIS HC A03/MF A01

CSCL 11D

CARBON FIBER REINFORCED PLASTICS, COMPRESSION TESTS, HIGH TEMPERATURE TESTS, POLYIMIDES

**N80-19193\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ASSESSMENT OF CARBON FIBER ELECTRICAL EFFECTS**

Washington Mar. 1980 278 p refs Conf. held in Hampton, Va., 4-5 Dec. 1979

(NASA-CP-2119; L-13503) Avail: NTIS HC A13/MF A01

CSCL 11D

AIRCRAFT ACCIDENTS, CARBON FIBERS, COMPOSITE MATERIALS, ELECTRIC EQUIPMENT, FIRES

**N80-27428\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **MOISTURE DETERMINATION IN COMPOSITE MATERIALS USING POSITRON LIFETIME TECHNIQUES**

J. J. SINGH, W. R. HOLT, and W. MOCK, JR. Jul. 1980 23 p refs

(NASA-TP-1681; L-13651) Avail: NTIS HC A02/MF A01

CSCL 11D

COMPOSITE MATERIALS, MOISTURE CONTENT, POSITRONS

**N80-28436\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SELECTED NASA RESEARCH IN COMPOSITE MATERIALS AND STRUCTURES**

1980 237 p refs Presented at the 2d Ind. Rev. of the NASA Aircraft Energy Efficiency (ACEE) Composite Programs, Seattle, 11-13 Aug. 1980

(NASA-CP-2142; L-13915) Avail: NTIS HC A15/MF A01

CSCL 11D

AIRCRAFT CONSTRUCTION MATERIALS, AIRCRAFT STRUCTURES, CONFERENCES, FIBER COMPOSITES, GRAPHITE-EPOXY COMPOSITES, POLYMER MATRIX COMPOSITES

**N80-30441\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **OUTGASSING DATA FOR SPACECRAFT MATERIALS**

W. A. CAMPBELL, JR., R. S. MARRIOTT, and J. J. PARK Aug. 1980 259 p refs

(NASA-RP-1061; REPT-80-F-7000) Avail: NTIS HC A12/MF A01

CSCL 11D

A system for determining the mass loss in vacuum and for collecting the outgassed compounds was developed. Outgassing data, derived from tests at 398 K (125 degrees C) for 24 hours in vacuum as per ASTM E 59577, are compiled for numerous materials for spacecraft use. The data presented are the total mass loss (TML) and the collected volatile condensable materials

(CVCN). The various materials are compiled by likely usage and alphabetically. R.K.G.

**N81-11115\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FRACTURE TOUGHNESS OF BORON/ALUMINUM LAMINATES WITH VARIOUS PROPORTIONS OF 0 DEG AND PLUS OR MINUS 45 DEG**

C. C. POE, JR. and J. A. SOVA (Joint Inst. for the Advancement of Flight Sciences, Hampton, Va.) Nov. 1980 39 p refs (NASA-TP-1707; L-13880) Avail: NTIS HC A03/MF A01 CSCL 11D

ALUMINUM BORON COMPOSITES, AXIAL LOADS, ELASTIC PROPERTIES, FRACTURE STRENGTH, LAMINATES, TENSILE STRESS

**N81-14001\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF TEMPERATURE, THERMAL EXPOSURE, AND FATIGUE ON AN ALUMINA/ALUMINUM COMPOSITE**

G. C. OLSEN Dec. 1980 35 p refs (NASA-TP-1795; L-14074) Avail: NTIS HC A03/MF A01 CSCL 11D

ALUMINUM OXIDES, FIBER REINFORCED COMPOSITES, METAL MATRIX COMPOSITES

**N81-16129\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TESTS OF GRAPHITE/POLYIMIDE SANDWICH PANELS IN UNIAXIAL EDGEWISE COMPRESSION**

C. J. CAMARDA Dec. 1980 79 p refs (NASA-TP-1785; L-13998) Avail: NTIS HC A05/MF A01 CSCL 11D

COMPRESSION LOADS, GRAPHITE-POLYIMIDE COMPOSITES, SANDWICH STRUCTURES

**N81-16130\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MECHANICAL PROPERTY CHARACTERIZATION OF BORSIC/ALUMINUM LAMINATES AT ROOM AND ELEVATED TEMPERATURES**

R. R. MCWITHEY and D. M. ROYSTER Dec. 1980 65 p refs (NASA-TP-1761; L-13763) Avail: NTIS HC A04/MF A01 CSCL 11D

ALUMINUM, BORSIC (TRADE NAME), COMPOSITE MATERIALS, MECHANICAL PROPERTIES

**N81-18096\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RISK TO THE PUBLIC FROM CARBON FIBERS RELEASED IN CIVIL AIRCRAFT ACCIDENTS**

1980 71 p refs (NASA-SP-448) Avail: NTIS HC A04/MF A01 CSCL 11D

Because carbon fibers are strong, stiff, and lightweight, they are attractive for use in composite structures. Because they also have high electrical conductivity, free carbon fibers settling on electrical conductors can cause malfunctions. If released from the composite by burning, the fibers may become a hazard to exposed electrical and electronic equipment. As part of a Federal study of the potential hazard associated with the use of carbon fibers, NASA assessed the public risk associated with crash fire accidents of civil aircraft. The NASA study projected a dramatic increase in the use of carbon composites in civil aircraft and developed technical data to support the risk assessment. Personal injury was found to be extremely unlikely. In 1993, the year chosen as a focus for the study, the expected annual cost of damage caused by released carbon fibers is only \$1000. Even the worst-case carbon fiber incident simulated (costing \$178,000 once in 34,000 years) was relatively low-cost compared with the usual air transport accident cost. On the basis of these observations, the NASA study concluded that exploitation of composites should continue, that additional protection of avionics is unnecessary, and that

development of alternate materials specifically to overcome this problem is not justified. Author

**N81-24178\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STRESS-CONCENTRATION FACTORS FOR FINITE ORTHOTROPIC LAMINATES WITH A PIN-LOADED HOLE**

J. H. CREWS, JR., C. S. HONG (Korea Inst. of Science, Seoul), and I. S. RAJU (George Washington Univ., Hampton, Va.) May 1981 43 p refs

(NASA-TP-1862) Avail: NTIS HC A03/MF A01 CSCL 11D  
FINITE ELEMENT METHOD, LAMINATES, ORTHOTROPISM, STRESS INTENSITY FACTORS

**N81-24179\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF STATIC TENSILE LOAD ON THE THERMAL EXPANSION OF GR/PI COMPOSITE MATERIAL**

G. L. FARLEY Jun. 1981 35 p refs Prepared in cooperation with Army Aviation Research and Development Command, Hampton, Va.

(DA PROJ. 1L1-61102-AH-45)  
(NASA-TP-1867; AVRADCOM-TR-81-B-2; L-14012) Avail: NTIS HC A03/MF A01 CSCL 11D

GRAPHITE-POLYIMIDE COMPOSITES, STATIC LOADS, TENSILE STRESS, THERMAL EXPANSION

**N82-22317\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LONG-TERM THERMAL DEGRADATION AND ALLOYING CONSTITUENT EFFECTS ON FIVE BORON/ALUMINUM COMPOSITES**

G. C. OLSEN Apr. 1982 107 p refs (NASA-TP-1977; L14779; NAS 1.60:1977) Avail: NTIS HC A06/MF A01 CSCL 11D

ALUMINUM BORON COMPOSITES, BORON REINFORCED MATERIALS, METAL MATRIX COMPOSITES, THERMAL DEGRADATION, THERMAL FATIGUE, THERMAL STABILITY

**N82-25325\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL DATA ON SINGLE-BOLT JOINTS IN QUASI ISOTROPIC GRAPHITE/POLYIMIDE LAMINATES**

G. R. WICHOREK May 1982 45 p refs (NASA-TP-2015; L-15103; NAS 1.60:2015) Avail: NTIS HC A03/MF A01 CSCL 11D

BOLTS, FAILURE MODES, GRAPHITE-POLYIMIDE COMPOSITES, JOINTS (JUNCTIONS), SHEAR STRENGTH, TENSILE STRENGTH

**N82-31451\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTERFACE CONTROL AND MECHANICAL PROPERTY IMPROVEMENTS IN SILICON CARBIDE/TITANIUM COMPOSITES**

W. D. BREWER and J. UNNAM (Virginia Polytechnic Inst. and State Univ.) Aug. 1982 22 p refs (NASA-TP-2066; L-15381; NAS 1.60:2066) Avail: NTIS HC A02/MF A01 CSCL 11D

DEGRADATION, FIBER REINFORCED COMPOSITES, MATRIX MATERIALS, SILICON CARBIDES, TITANIUM

**N83-16400\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**IDENTIFICATION AND MANAGEMENT OF FILAMENT-WOUND CASE STIFFNESS PARAMETERS**

V. VERDERAIME and M. RHEINFURTH Jan. 1983 17 p refs (NASA-TP-2117; NAS 1.60:2117) Avail: NTIS HC A02/MF A01 CSCL 11D

FILAMENT WINDING, HOUSINGS, SOLID PROPELLANT ROCKET ENGINES, SPACE SHUTTLES

## 24 COMPOSITE MATERIALS

**N83-24561\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **BUCKLING AND FAILURE CHARACTERISTICS OF GRAPHITE-POLYIMIDE SHEAR PANELS**

M. J. SHUART and J. A. HAGAMAN May 1983 24 p refs (NASA-TP-2153; L-15557; NAS 1.60:2153) Avail: NTIS HC A02/MF A01 CSCL 11D

BUCKLING, FAILURE MODES, GRAPHITE-POLYIMIDE COMPOSITES, PANELS, STRESS-STRAIN RELATIONSHIPS, TEMPERATURE EFFECTS, THERMAL EXPANSION

**N83-24562\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **FAILURE MECHANISMS IN LOW-VELOCITY IMPACTS ON THIN COMPOSITE PLATES**

W. ELBER May 1983 26 p refs (NASA-TP-2152; L-15588; NAS 1.60:2152) Avail: NTIS HC A03/MF A01 CSCL 11D

EPOXY RESINS, FAILURE ANALYSIS, IMPACT TESTS, LOW SPEED, PLATES (STRUCTURAL MEMBERS)

**N83-28098\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **FABRICATION AND EVALUATION OF BRAZED TITANIUM-CLAD BORSIC/ALUMINUM SKIN-STRINGER PANELS**

T. T. BALES, D. M. ROYSTER, and R. R. MCWITHEY Jul. 1980 41 p refs (NASA-TP-1674; L-13413; NAS 1.60:1674) Avail: NTIS HC A03/MF A01 CSCL 11D

AIRFRAME MATERIALS, BORSIC (TRADE NAME), BRAZING, FABRICATION, HONEYCOMB STRUCTURES, STRINGERS

**N83-28099\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **COMPRESSION PANEL STUDIES FOR SUPERSONIC CRUISE VEHICLES Final Report**

R. R. MCWITHEY, D. M. ROYSTER, and W. L. KO Mar. 1980 24 p refs (NASA-TP-1617; L-13525; NAS 1.60:1617) Avail: NTIS HC A02/MF A01 CSCL 11D

AIRCRAFT CONSTRUCTION MATERIALS, METAL MATRIX COMPOSITES, RIGID STRUCTURES, SUPERSONIC CRUISE AIRCRAFT RESEARCH

**N83-28100\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **FABRICATION AND EVALUATION OF BRAZED TITANIUM-CLAD BORSIC/ALUMINUM COMPRESSION PANELS Final Report**

D. M. ROYSTER, R. R. MCWITHEY, and T. T. BALES Mar. 1980 43 p refs (NASA-TP-1573; L-13112; NAS 1.60:1573) Avail: NTIS HC A03/MF A01 CSCL 11D

AIRCRAFT CONSTRUCTION MATERIALS, ALUMINUM ALLOYS, BORON REINFORCED MATERIALS, METAL MATRIX COMPOSITES, RIGID STRUCTURES, TITANIUM ALLOYS

**N83-31730\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STANDARD TESTS FOR TOUGHENED RESIN COMPOSITES, REVISED EDITION**

Jul. 1983 38 p refs (NASA-RP-1092-REV; L-15317; NAS 1.61:1092-REV) Avail: NTIS HC A03/MF A01 CSCL 11D

Several toughened resin systems are evaluated to achieve commonality for certain kinds of tests used to characterize toughened resin composites. Specifications for five tests were standardized; these test standards are described. Author

**N83-33956\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF THE FRACTURE PROCESSES OF BORON/ALUMINUM LAMINATES CONTAINING NOTCHES**

W. S. JOHNSON, C. A. BIGELOW, and Y. A. BAHEI-EL-DIN (Cairo Univ.) Sep. 1983 44 p refs (NASA-TP-2187; L-15574; NAS 1.60:2187) Avail: NTIS HC A03/MF A01 CSCL 11D

ALUMINUM, BORON, FRACTURE MECHANICS, LAMINATES, METAL MATRIX COMPOSITES

**N83-33957\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **FAILURE ANALYSIS AND MECHANISMS OF FAILURE OF FIBROUS COMPOSITE STRUCTURES**

A. K. NOOR, comp. (George Washington Univ.), M. J. SHUART, comp., J. H. STARNES, JR., comp., and J. G. WILLIAMS, comp. Aug. 1983 382 p refs Workshop held in Hampton, Va., 23-25 Mar. 1982

(NASA-CP-2278; L-15641; NAS 1.55:2278) Avail: NTIS HC A17/MF A01 CSCL 11D

AIRCRAFT STRUCTURES, COMPOSITE STRUCTURES, CONFERENCES, FAILURE ANALYSIS, FIBER COMPOSITES

**N84-13224\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **INHYD: COMPUTER CODE FOR INTRAPLY HYBRID COMPOSITE DESIGN. A USERS MANUAL**

C. C. CHAMIS and J. H. SINCLAIR Dec. 1983 41 p refs (NASA-TP-2239; E-1755; NAS 1.60:2239) Avail: NTIS HC A03/MF A01 CSCL 11D

COMPOSITE MATERIALS, PLY ORIENTATION, THERMO-DYNAMICS

**N84-23698\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **SOLAR ABSORPTANCE AND THERMAL EMITTANCE OF SOME COMMON SPACECRAFT THERMAL-CONTROL COATINGS**

J. H. HENNINGER Apr. 1984 47 p refs (NASA-RP-1121; REPT-84F0248; NAS 1.61:1121) Avail: NTIS HC A03/MF A01 CSCL 11D

Solar absorptance and thermal emittance of spacecraft materials are critical parameters in determining spacecraft temperature control. Because thickness, surface preparation, coatings formulation, manufacturing techniques, etc. affect these parameters, it is usually necessary to measure the absorptance and emittance of materials before they are used. Absorptance and emittance data for many common types of thermal control coatings, are together with some sample spectral data curves of absorptance. In some cases for which ultraviolet and particle radiation data are available, the degraded absorptance and emittance values are also listed. M.A.C.

**N84-26751\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **OUTGASSING DATA FOR SELECTING SPACECRAFT MATERIALS**

W. A. CAMPBELL, JR., R. S. MARRIOTT, and J. J. PARK Jun. 1984 280 p refs (NASA-RP-1124; REPT-84B0271; NAS 1.61:1124) Avail: NTIS HC A13/MF A01 CSCL 11D

Outgassing data, derived from tests at 398 K (125 C) for 24 hours in vacuum as per ASTM E 595-77, were compiled for numerous materials for spacecraft use. The data presented are the total mass loss (TML) and the collected volatile condensable materials (CVCM). The various materials are grouped as: adhesives; cable insulation and shrink tubing; conformal coating; electrical components; electrical shields; films and sheet materials, foams; greases and lubricants; lacing tape and cord cable ties; laminates and circuit boards; marking materials and inks; molding compounds; paints, lacquers, and varnishes; potting compounds; and rubbers

and elastomers. The materials are also listed alphabetically.

A.R.H.

**N84-29969\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ACEE COMPOSITE STRUCTURES TECHNOLOGY: REVIEW OF SELECTED NASA RESEARCH ON COMPOSITE MATERIALS AND STRUCTURES**

Washington Aug. 1984 181 p refs Conf. held in Seattle, 13-16 Aug. 1984

(NASA-CP-2321; L-15834; NAS 1.55:2321) Avail: NTIS HC

A09/MF A01 CSCL 11D

ACEE PROGRAM, AIRCRAFT CONSTRUCTION MATERIALS, AIRCRAFT DESIGN, AIRCRAFT STRUCTURES, COMPOSITE MATERIALS, CONFERENCES, STRUCTURAL DESIGN

**N84-33521\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**DEVELOPMENT OF IN SITU STIFFNESS PROPERTIES FOR SHUTTLE BOOSTER FILAMENT WOUND CASE**

V. VERDERAIME Aug. 1984 57 p refs

(NASA-TP-2377; NAS 1.60:2377) Avail: NTIS HC A04/MF A01

CSCL 11D

ELASTIC PROPERTIES, PRESSURE VESSELS, ROCKET ENGINE CASES, SPACE SHUTTLES, STIFFNESS

**N85-11136\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FRACTURE TOUGHNESS OF FIBROUS COMPOSITE MATERIALS**

C. C. POE, JR. Nov. 1984 68 p refs

(NASA-TP-2370; L-15848; NAS 1.60:2370) Avail: NTIS HC

A04/MF A01 CSCL 11D

FIBER COMPOSITES, FIBER ORIENTATION, FRACTURE STRENGTH, GRAPHITE-EPOXY COMPOSITES, LAMINATES, LAY-UP

**N85-12094\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LONG-TERM THERMAL AGING OF 2 GRAPHITE-POLYIMIDE COMPOSITE MATERIALS**

J. B. NELSON 1984 28 p refs

(NASA-TP-2369; L-15849; NAS 1.60:2369) Avail: NTIS HC

A03/MF A01 CSCL 11D

AGING (MATERIALS), FLEXING, GRAPHITE-POLYIMIDE COMPOSITES, LONG TERM EFFECTS, PANELS, TEMPERATURE EFFECTS

**N85-12941\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TOUGH COMPOSITE MATERIALS**

L. F. VOSTEEN, comp., N. J. JOHNSON, comp., and L. A. TEICHMAN, comp. Washington Dec. 1984 379 p refs Workshop held in Hampton, Va., 24-26 May 1983

(NASA-CP-2334; L-15857; NAS 1.55:2334) Avail: NTIS HC

A17/MF A01 CSCL 11D

CONFERENCES, EPOXY MATRIX COMPOSITES, FIBER COMPOSITES, FRACTURE STRENGTH, IMPACT STRENGTH, LAMINATES, POLYMER MATRIX COMPOSITES, RESIN MATRIX COMPOSITES, TOUGHNESS

**N85-25435\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SPECTROSCOPIC ANALYSIS OF RADIATION-GENERATED CHANGES IN TENSILE PROPERTIES OF A POLYETHERIMIDE FILM**

E. R. LONG, JR. and S. A. T. LONG May 1985 38 p refs

(NASA-TP-2429; L-15873; NAS 1.60:2429) Avail: NTIS HC

A03/MF A01 CSCL 11D

EXPOSURE, EXTRATERRESTRIAL RADIATION, POLYIMIDES, RADIATION EFFECTS, SPECTROSCOPIC ANALYSIS, TENSILE PROPERTIES

**N85-26923\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NASA/AIRCRAFT INDUSTRY STANDARD SPECIFICATION FOR GRAPHITE FIBER TOUGHENED THERMOSET RESIN COMPOSITE MATERIAL**

Washington Jun. 1985 58 p

(NASA-RP-1142; L-15946; NAS 1.61:1142) Avail: NTIS HC

A04/MF A01 CSCL 11D

A standard specification for a selected class of graphite fiber/toughened thermoset resin matrix material was developed through joint NASA/Aircraft Industry effort. This specification was compiled to provide uniform requirements and tests for qualifying prepreg systems and for acceptance of prepreg batches. The specification applies specifically to a class of composite prepreg consisting of unidirectional graphite fibers impregnated with a toughened thermoset resin that produce laminates with service temperatures from -65 F to 200 F when cured at temperatures below or equal to 350 F. The specified prepreg has a fiber areal weight of 145 g sq m. The specified tests are limited to those required to set minimum standards for the uncured prepreg and cured laminates, and are not intended to provide design allowable properties.

Author

**N85-26924\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF LOW-VELOCITY OR BALLISTIC IMPACT DAMAGE ON THE STRENGTH OF THIN COMPOSITE AND ALUMINUM SHEAR PANELS**

G. L. FARLEY (Army Research and Technology Lab., Hampton, Va.) May 1985 40 p refs

(DA PROJ. 1L1-61102-H-4503)

(NASA-TP-2441; L-15942; NAS 1.60:2441; AVSCOM-TR-85-B-1)

Avail: NTIS HC A03/MF A01 CSCL 11D

ALUMINUM, BALLISTICS, FIBER REINFORCED COMPOSITES, GRAPHITE-EPOXY COMPOSITES, IMPACT STRENGTH, KEVLAR (TRADEMARK)

**N86-11260\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**HIGH TEMPERATURE POLYMER MATRIX COMPOSITES**

Washington Sep. 1985 409 p refs Conf. held in Cleveland, Ohio, 16-18 Mar. 1983

(NASA-CP-2385; E-2425; NAS 1.55:2385) Avail: NTIS HC

A18/MF A01 CSCL 11D

ADHESIVES, AIRCRAFT CONSTRUCTION MATERIALS, CHARACTERIZATION, COMPOSITE MATERIALS, DESIGN ANALYSIS, ENVIRONMENT EFFECTS, MATRIX MATERIALS, QUALITY CONTROL

**N86-20508\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STRENGTH OF GRAPHITE/EPOXY BOLTED WING-SKIN SPLICE SPECIMENS SUBJECTED TO OUTDOOR EXPOSURE UNDER CONSTANT LOAD AND YEARLY FATIGUE LOADING**

G. R. WICHOREK and J. H. CREWS, JR. 1986 35 p refs

(NASA-TP-2542; L-16065; NAS 1.60:2542) Avail: NTIS HC

A03/MF A01 CSCL 11D

GRAPHITE-EPOXY COMPOSITES, RESIDUAL STRENGTH, SKIN (STRUCTURAL MEMBER), TRANSPORT AIRCRAFT, WINGS

**N86-21614\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INTEGRATED COMPOSITE ANALYZER (ICAN): USERS AND PROGRAMMERS MANUAL**

P. L. N. MURTHY and C. C. CHAMIS Mar. 1986 77 p refs

(NASA-TP-2515; E-2035; NAS 1.60:2515) Avail: NTIS HC

A05/MF A01 CSCL 11D

COMPUTER PROGRAMS, FIBER COMPOSITES, STRUCTURAL ANALYSIS, USER MANUALS (COMPUTER PROGRAMS)

## INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

**N77-33297\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LEAN PREMIXED/PREVAPORIZED COMBUSTION**

A. H. LEFEBVRE, ed. (Purdue Univ., Lafayette, Ind.) 21 Jan. 1977 46 p Presented at Workshop, Cleveland, Ohio, 20-21 Jan. 1977

(NASA-CP-2016; E-9255) Avail: NTIS HC A03/MF A01 CSCI 21B

GAS TURBINE ENGINES, JET EXHAUST, POLLUTION CONTROL, PREMIXED FLAMES

**N78-12167\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF TRICHLOROFLUOROMETHANE AND MOLECULAR CHLORINE ON OZONE FORMATION BY SIMULATED SOLAR RADIATION**

D. A. BITTKER and E. L. WONG Nov. 1977 22 p refs (NASA-TP-1093; E-9078) Avail: NTIS HC A02/MF A01 CSCI 04A

CHLORINE, CHLORINE COMPOUNDS, OZONE, OZONE FLUORIDE, SOLAR RADIATION

**N78-16119\*#** National Bureau of Standards, Boulder, Colo. Cryogenics Div.

**THERMODYNAMIC AND RELATED PROPERTIES OF OXYGEN FROM THE TRIPLE POINT TO 300 K AT PRESSURES TO 1000 BAR**

L. A. WEBER Dec. 1977 164 p refs (NASA-RP-1011; NBSIR-77-865) Avail: NTIS HC A08/MF A01 CSCI 07D

The results of an experimental program are presented in the form of PVT data in the temperature range 58 to 300 K at pressures up to 800 bar. Tables of the derived thermodynamic properties on isobars to 1000 bar are given, including density, internal energy, enthalpy, entropy, specific heats at constant volume and constant pressure, velocity of sound, and the surface derivatives ( $\Delta P/\Delta T$ ) sub rho and ( $\Delta P/\Delta T$ ) sub T. Auxiliary tables in engineering units are also given. The accuracy of the data is discussed and comparisons are made with previous data.

Author

**N78-20281\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF NITRIC OXIDE ON PHOTOCHEMICAL OZONE FORMATION IN MIXTURES OF AIR WITH MOLECULAR CHLORINE AND WITH TRICHLOROFLUOROMETHANE**

D. A. BITTKER and E. L. WONG Apr. 1978 25 p refs (NASA-TP-1192; E-9297) Avail: NTIS HC A02/MF A01 CSCI 07D

CHLOROCARBONS, NITRIC OXIDE, OZONE PHOTOCHEMICAL REACTIONS

**N78-22188\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ADSORPTION AND CHEMICAL REACTION OF GASEOUS MIXTURES OF HYDROGEN CHLORIDE AND WATER ON ALUMINUM OXIDE AND APPLICATION TO SOLID-PROPELLANT ROCKET EXHAUST CLOUDS**

W. R. COFER, III and G. L. PELLETT Apr. 1978 39 p refs (NASA-TP-1105; L-11800) Avail: NTIS HC A03/MF A01 CSCI 07D

ADSORPTION, ALUMINUM OXIDES, CHEMICAL REACTIONS, HYDROGEN CHLORIDES

**N78-23172\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND ANALYTICAL STUDY OF NITRIC OXIDE FORMATION DURING COMBUSTION OF PROPANE IN A JET-STIRRED COMBUSTOR**

N. T. WAKELYN, C. J. JACHIMOWSKI, and C. H. WILSON May 1978 23 p refs

(NASA-TP-1181; L-12052) Avail: NTIS HC A02/MF A01 CSCI 07D

COMBUSTION, INJECTORS, NITRIC OXIDE

**N79-12178\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ENHANCED HYDROPHILICITY OF CHLORIDED ALUMINUM OXIDE PARTICULATES**

W. R. COFER, III Nov. 1978 28 p refs (NASA-TP-1312; L-12265) Avail: NTIS HC A02/MF A01 CSCI 07D

ALUMINUM OXIDES, CHEMISORPTION, HYDROCHLORIC ACID, HYDROGENATION, PARTICULATES

**N79-14177\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A HIGH-PRESSURE PREMIXED FLAT-FLAME BURNER FOR CHEMICAL PROCESS STUDIES**

I. M. MILLER Dec. 1978 31 p refs (NASA-TP-1318; L-12347) Avail: NTIS HC A03/MF A01 CSCI 21B

AIR POLLUTION, BURNERS, CHEMICAL REACTORS, METHANE, PREMIXED FLAMES

**N79-22246\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CONTROL OF VOLUME RESISTIVITY IN INORGANIC ORGANIC SEPARATORS**

D. W. SHEIBLEY and M. A. MANZO Apr. 1979 17 p refs (NASA-TP-1439; E-9830) Avail: NTIS HC A02/MF A01 CSCI 07D

ALKALINE BATTERIES, ELECTRICAL RESISTIVITY, INORGANIC COATINGS, ORGANIC COMPOUNDS, SEPARATORS

**N79-25181\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**IMPROVED, LOW COST INORGANIC-ORGANIC SEPARATORS FOR RECHARGEABLE SILVER-ZINC BATTERIES**

D. W. SHEIBLEY Jun. 1979 27 p refs (NASA-TP-1476; E-9930) Avail: NTIS HC A03/MF A01 CSCI 07D

CURRENT DENSITY, INORGANIC COMPOUNDS, ORGANIC COMPOUNDS, SEPARATORS, SILVER ZINC BATTERIES

**N79-28259\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CHEMICAL KINETIC MODELING OF BENZENE AND TOLUENE OXIDATION BEHIND SHOCK WAVES**

A. G. MCLAIN, C. J. JACHIMOWSKI, and C. H. WILSON Aug. 1979 26 p refs

(NASA-TP-1472; L-12803) Avail: NTIS HC A03/MF A01 CSCI 07D

BENZENE, OXIDATION, REACTION KINETICS, SHOCK WAVES, TOLUENE

**N80-13191\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF PRESSURE ON STRUCTURE AND NO SUB X FORMATION IN CO-AIR DIFFUSION FLAMES**

H. G. MAAHS and I. M. MILLER Oct. 1979 58 p refs (NASA-TP-1448; L-12731) Avail: NTIS HC A04/MF A01 CSCI 21B

CARBON MONOXIDE, DIFFUSION FLAMES, NITROGEN OXIDES, PRESSURE EFFECTS



**N80-16118\*#** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

**NITROGEN DIOXIDE VAPOR PENETRATION OF CHLOROBUTYL RUBBER SCAPES UNDER OPERATIONAL CONDITIONS**

T. A. SCHEHL and T. W. BEALL Feb. 1980 78 p refs (NASA-TP-1605) Avail: NTIS HC A05/MF A01 CSCL 07D  
CONCENTRATION (COMPOSITION), NITROGEN DIOXIDE, PERMEATING, PROTECTIVE CLOTHING, RUBBER, VAPORS

**N80-25392\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**POLLUTANT EMISSIONS FROM FLAT-FLAME BURNERS AT HIGH PRESSURES**

H. G. MAAHS and I. M. MILLER Jun. 1980 41 p refs (NASA-TP-1673; L-13550) Avail: NTIS HC A03/MF A01 CSCL 07D

AIR POLLUTION, BURNERS, CONTAMINANTS, EMISSION, EXHAUST GASES, HIGH PRESSURE

**N81-14017\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CHEMICAL KINETIC MODELS FOR COMBUSTION OF HYDROCARBONS AND FORMATION OF NITRIC OXIDE**

C. J. JACHIMOWSKI and C. H. WILSON Dec. 1980 32 p refs (NASA-TP-1794; L-14106) Avail: NTIS HC A03/MF A01 CSCL 21B

CHEMICAL REACTIONS, HYDROCARBONS, NITRIC OXIDE, REACTION KINETICS

**N81-27223\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CHEMICAL KINETIC ANALYSIS OF HYDROGEN-AIR IGNITION AND REACTION TIMES**

R. C. ROGERS and C. J. SCHEXNAYDER, JR. Jul. 1981 54 p refs (NASA-TP-1856; L-14379) Avail: NTIS HC A04/MF A01 CSCL 07D

AIR, CHEMICAL REACTIONS, HYDROGEN FUELS, IGNITION, REACTION KINETICS

**N82-22330\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CARBON-CATALYZED OXIDATION OF SO<sub>2</sub> BY NO<sub>2</sub> AND AIR**

R. S. ROGOWSKI, D. R. SCHRYER, W. R. COFER, III, R. A. EDAHL, JR., and S. MUNAVALLI (Livingstone College) Apr. 1982 10 p refs Submitted for publication (NASA-TP-2014; L-15214; NAS 1.60:2014) Avail: NTIS HC A02/MF A01 CSCL 07D

ATMOSPHERIC CHEMISTRY, CARBON, CATALYSIS, CATALYSTS, NITROGEN DIOXIDE, OXIDATION, SULFUR DIOXIDES

**N83-18863\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MECHANISM OF LUBRICATION BY TRICRESYLPHOSPHATE (TCP)**

O. D. FAUT and D. R. WHEELER Feb. 1983 13 p refs Presented at the ASLE Lubrication Conf., Washington, D.C., 5-7 Oct. 1982 (NASA-TP-2053; E-1244; NAS 1.60:2053) Avail: NTIS HC A02/MF A01 CSCL 11H

CHEMICAL REACTIONS, COEFFICIENT OF FRICTION, LUBRICANTS, METAL SURFACES, PHOSPHATES, TEMPERATURE MEASUREMENT

**N83-19825\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A CHEMICAL KINETIC MIXTURE FOR THE IGNITION OF SILANE/HYDROGEN MIXTURES**

C. J. JACHIMOWSKI and A. G. MCLAIN Feb. 1983 20 p refs (NASA-TP-2129; L-15542; NAS 1.60:2129) Avail: NTIS HC A02/MF A01 CSCL 21B

IGNITION, REACTION KINETICS, SILANES

**N83-24575\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL DESIGN OF AN INTERLABORATORY STUDY FOR TRACE METAL ANALYSIS OF LIQUID FLUIDS**

L. A. GREENBAUER-SENG May 1983 44 p refs (NASA-TP-2148; E-1311; NAS 1.60:2148) Avail: NTIS HC A03/MF A01 CSCL 07D

AEROSPACE VEHICLES, CONTAMINANTS, LIQUID FUELS, TRACE ELEMENTS

**N84-11230\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**METALLURGICAL CHARACTERIZATION OF THE FRACTURE OF SEVERAL HIGH STRENGTH ALUMINUM ALLOYS**

M. D. BHANDARKAR and W. B. LISAGOR Dec. 1977 71 p refs (NASA-TP-1086; L-11255; NAS 1.60:1086) Avail: NTIS HC A04/MF A01 CSCL 11F

ALUMINUM ALLOYS, FRACTURE MECHANICS, HEAT TREATMENT, MICROSTRUCTURE, PHASE TRANSFORMATIONS

**N84-32446\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**GCKP84-GENERAL CHEMICAL KINETICS CODE FOR GAS-PHASE FLOW AND BATCH PROCESSES INCLUDING HEAT TRANSFER EFFECTS**

D. A. BITTKER and V. J. SCULLIN Sep. 1984 101 p refs (NASA-TP-2320; E-1885; NAS 1.60:2320) Avail: NTIS HC A06/MF A01 CSCL 07D

BATCH PROCESSING, COMPUTER PROGRAMS, GAS FLOW, HEAT TRANSFER, IDEAL GAS, REACTION KINETICS

**N85-31244\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FUEL-RICH CATALYTIC COMBUSTION: A SOOT-FREE TECHNIQUE FOR IN SITU HYDROGEN-LIKE ENRICHMENT**

T. A. BRABBS and S. L. OLSON Jul. 1985 12 p refs Presented at the Fall Meeting of the Eastern Sect. of the Combust. Inst., Clearwater Beach, Fla., 3-5 Dec. 1984 (NASA-TP-2498; E-2604; NAS 1.60:2498) Avail: NTIS HC A02/MF A01 CSCL 21B

BENZENE, CATALYSIS, COMBUSTION PRODUCTS, FUEL COMBUSTION, HYDROCARBON FUELS, OXIDATION, PARTICULATE SAMPLING, PYROLYSIS, SOOT

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### METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

**N77-32286\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF CARBON CONTENT ON FRICTION AND WEAR OF CAST IRONS**

D. H. BUCKLEY Sep. 1977 22 p refs (NASA-TP-1052; E-9110) Avail: NTIS HC A02/MF A01 CSCL 11F

CARBON, CAST ALLOYS, FRICTION, IRON, WEAR

## 26 METALLIC MATERIALS

**N78-11230\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**SECONDARY-ELECTRON-EMISSION PROPERTIES OF CONDUCTING SURFACES WITH APPLICATION TO MULTISTAGE DEPRESSED COLLECTORS FOR MICROWAVE AMPLIFIERS**

R. FORMAN Nov. 1977 33 p refs  
 (NASA-TP-1097; E-9233) Avail: NTIS HC A03/MF A01 CSDL 11F

CONDUCTORS, ELECTRODES, ELECTRON EMISSION, MICROWAVE AMPLIFIERS

**N78-15229\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF SEVERAL COMPRESSOR GAS-PATH SEAL MOVEMENTS**

R. C. BILL and D. W. WISANDER Jan. 1978 42 p refs  
 (NASA-TP-1128; E-9276) Avail: NTIS HC A03/MF A01 CSDL 11A

COEFFICIENT OF FRICTION, COMPRESSORS, PLASMA SPRAYING, SEALS (STOPPERS), WEAR

**N78-15230\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FEASIBILITY STUDY OF TUNGSTEN AS A DIFFUSION BARRIER BETWEEN NICKEL-CHROMIUM-ALUMINUM AND GAMMA/GAMMA PRIME - DELTA EUTECTIC ALLOYS**

S. G. YOUNG and G. R. ZELLARS Jan. 1978 35 p refs  
 (NASA-TP-1131; E-9271) Avail: NTIS HC A03/MF A01 CSDL 11F

BARRIER LAYERS, DIFFUSION, EUTECTICS, NICKEL ALLOYS, TUNGSTEN

**N78-15236\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CORRECTION FACTORS FOR ON-LINE MICROPROBE ANALYSIS OF MULTIELEMENT ALLOY SYSTEMS**

J. UNNAM, D. R. TENNEY, and W. D. BREWER Nov. 1977 216 p refs  
 (NASA-RP-1006) Avail: NTIS HC A10/MF A01 CSDL 11F

An on-line correction technique was developed for the conversion of electron probe X-ray intensities into concentrations of emitting elements. This technique consisted of off-line calculation and representation of binary interaction data which were read into an on-line minicomputer to calculate variable correction coefficients. These coefficients were used to correct the X-ray data without significantly increasing computer core requirements. The binary interaction data were obtained by running Colby's MAGIC 4 program in the reverse mode. The data for each binary interaction were represented by polynomial coefficients obtained by least-squares fitting a third-order polynomial. Polynomial coefficients were generated for most of the common binary interactions at different accelerating potentials and are included. Results are presented for the analyses of several alloy standards to demonstrate the applicability of this correction procedure. Author

**N78-21269\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INFLUENCE OF FRETTING ON FLEXURAL FATIGUE OF 304 STAINLESS STEEL AND MILD STEEL**

R. C. BILL (Army R and T Labs.) and D. A. ROHN Apr. 1978 19 p refs  
 (NASA-TP-1193; E-9414) Avail: NTIS HC A02/MF A01 CSDL 11F

CRACKING (FRACTURING), FATIGUE LIFE, FATIGUE TESTS, FRETTING, STAINLESS STEELS

**N78-26198\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROLE OF ALLOYING ELEMENTS IN ADHESIVE TRANSFER AND FRICTION OF COPPER-BASE ALLOYS**

D. H. BUCKLEY Jun. 1978 19 p refs  
 (NASA-TP-1256; E-9471) Avail: NTIS HC A02/MF A01 CSDL 11F

ADHESION, COPPER ALLOYS, SLIDING FRICTION

**N78-26199\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MORPHOLOGY OF GOLD AND COPPER ION-PLATED COATINGS**

T. SPALVINS Jun. 1978 17 p refs  
 (NASA-TP-1262; E-9528) Avail: NTIS HC A02/MF A01 CSDL 11F

COATINGS, COPPER, GOLD, SURFACE FINISHING

**N78-28225\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EROSION/CORROSION OF TURBINE AIRFOIL MATERIALS IN THE HIGH-VELOCITY EFFLUENT OF A PRESSURIZED FLUIDIZED COAL COMBUSTOR**

G. R. ZELLARS, A. P. ROWE, and C. E. LOWELL Jul. 1978 33 p refs  
 (NASA-TP-1274; E-9507) Avail: NTIS HC A03/MF A01 CSDL 11F

COAL, COMBUSTION PRODUCTS, CORROSION RESISTANCE, HEAT RESISTANT ALLOYS, TURBINE BLADES

**N78-28226\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**LOW TOXIC CORROSION INHIBITORS FOR ALUMINUM IN FRESH WATER**

T. S. HUMPHRIES Jul. 1978 17 p  
 (NASA-TP-1279; M-259) Avail: NTIS HC A02/MF A01 CSDL 11F

ALUMINUM, CHEMICAL COMPOUNDS, CORROSION PREVENTION, WATER

**N78-30205\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SIMULATION MODEL OF A SINGLE-STAGE LITHIUM BROMIDE-WATER ABSORPTION COOLING UNIT**

D. MIAO Aug. 1978 44 p refs  
 (NASA-TP-1296; E-9547) Avail: NTIS HC A03/MF A01 CSDL 20K

AIR CONDITIONING, COMPUTERIZED SIMULATION, COOLING SYSTEMS

**N78-30206\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF OXYGEN, METHYL MERCAPTAN, AND METHYL CHLORIDE ON FRICTION BEHAVIOR OF COPPER-IRON CONTACTS**

D. H. BUCKLEY Aug. 1978 19 p refs  
 (NASA-TP-1309; E-9606) Avail: NTIS HC A02/MF A01 CSDL 11F

FRICTION REDUCTION, METHYL CHLORIDE, OXYGEN, SLIDING FRICTION, SOLID-SOLID INTERFACES, THIOLS

**N78-31213\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF THERMOMECHANICAL PROCESSING ON STRENGTH AND TOUGHNESS OF IRON - 12-PERCENT-NICKEL - REACTIVE METAL ALLOYS AT -196 C**

J. R. STEPHENS and W. R. WITZKE Aug. 1978 36 p refs  
 (NASA-TP-1308; E-9583) Avail: NTIS HC A03/MF A01 CSDL 11F

ALLOYS, IRON, NICKEL, THERMODYNAMIC PROPERTIES, YIELD STRENGTH

C-2

**N78-33196\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LONG-TERM HOT-HARDNESS CHARACTERISTICS OF FIVE THROUGH-HARDENED BEARING STEELS**

N. E. ANDERSON Oct. 1978 20 p refs Prepared in cooperation with US Army Aviation Research and Development Command, St. Louis, Mo.

(NASA-TP-1341; E-9533) Avail: NTIS HC A02/MF A01 CSCL 11F

BEARING ALLOYS, HARDNESS TESTS, LONG TERM EFFECTS, STEELS, TEMPERING

**N79-13137\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**GEOMETRIC RELATIONSHIPS FOR HOMOGENIZATION IN SINGLE-PHASE BINARY ALLOY SYSTEMS**

J. UNNAM (George Washington Univ.), D. R. TENNEY, and B. A. STEIN Nov. 1978 15 p refs

(NASA-TP-1349; L-12588) Avail: NTIS HC A02/MF A01 CSCL 11F

BINARY ALLOYS, GEOMETRY, HOMOGENIZING, SURFACE PROPERTIES, VOLUME

**N79-13138\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF CONCENTRATION DEPENDENCE OF THE DIFFUSION COEFFICIENT ON HOMOGENIZATION KINETICS IN MULTIPHASE BINARY ALLOY SYSTEMS**

D. R. TENNEY and J. UNNAM (George Washington Univ.) Nov. 1978 39 p refs

(NASA-TP-1281; L-12224) Avail: NTIS HC A03/MF A01 CSCL 11F

BINARY ALLOYS, CONCENTRATION (COMPOSITION), DIFFUSION COEFFICIENT, HOMOGENIZING, KINETICS

**N79-16950\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**CHARACTERIZATION OF LARGE 2219 ALUMINUM ALLOY HAND FORGINGS FOR THE SPACE SHUTTLE SOLID ROCKET BOOSTER**

M. W. BRENNECKE Dec. 1978 107 p refs

(NASA-TP-1383; M-273) Avail: NTIS HC A06/MF A01 CSCL 11F

ALUMINUM ALLOYS, CHARACTERIZATION, FORGING, SPACE SHUTTLE BOOSTERS

**N79-21184\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**WEAR OF ALUMINUM AND HYPOEUTECTIC ALUMINUM-SILICON ALLOYS IN BOUNDARY-LUBRICATED PIN-ON DISK SLIDING**

J. FERRANTE and W. A. BRAINARD Apr. 1979 27 p refs

(NASA-TP-1442; E-9809) Avail: NTIS HC A03/MF A01 CSCL 11F

ALUMINUM, BOUNDARY LUBRICATION, EUTECTIC ALLOYS, SILICON, WEAR TESTS

**N79-28288\*#** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

**STUDY OF AUSTENITIC STAINLESS STEEL WELDED WITH LOW ALLOY STEEL FILLER METAL**

F. A. BURNS and R. A. DYKE, JR. Jun. 1979 32 p

(NASA-TP-1460) Avail: NTIS HC A03/MF A01 CSCL 11F

ALLOYS, AUSTENITIC STAINLESS STEELS, FILLERS, IMPACT STRENGTH, TENSILE STRENGTH, WELD TESTS

**N80-11188\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MECHANICAL PROPERTIES AND OXIDATION AND CORROSION RESISTANCE OF REDUCED-CHROMIUM 304 STAINLESS STEEL ALLOYS**

J. R. STEPHENS, C. A. BARRETT, and C. A. GYORGAK Washington Nov. 1979 22 p refs

(NASA-TP-1557; E-065) Avail: NTIS HC A02/MF A01 CSCL 11F

CHROMIUM ALLOYS, CORROSION RESISTANCE, STAINLESS STEELS, TENSILE PROPERTIES

**N80-15234\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ADHESION AND FRICTION OF IRON-BASE BINARY ALLOYS IN CONTACT WITH SILICON CARBIDE IN VACUUM**

K. MIYOSHI and D. H. BUCKLEY Jan. 1980 13 p refs

(NASA-TP-1604; E-126) Avail: NTIS HC A02/MF A01 CSCL 11F

ADHESION, BINARY ALLOYS, COEFFICIENT OF FRICTION, IRON, SILICON CARBIDES

**N80-16141\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SCANNING-ELECTRON-MICROSCOPE STUDY OF NORMAL-IMPINGEMENT EROSION OF DUCTILE METALS**

W. A. BRAINARD and J. SALIK Jan. 1980 11 p refs

(NASA-TP-1609; E-085) Avail: NTIS HC A02/MF A01 CSCL 11F

ALUMINUM, COPPER, ELECTRON MICROSCOPY, EROSION, IMPACT DAMAGE

**N80-32489\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LONG-TIME CREEP BEHAVIOR OF THE TANTALUM ALLOY ASTAR 811C**

W. D. KLOPP, R. H. TITRAN, and K. D. SHEFFLER (Pratt and Whitney Aircraft, East Hartford, Conn.) Sep. 1980 21 p refs

(NASA-TP-1691; E-041) CSCL 11F

CREEP ANALYSIS, GRAIN BOUNDARIES, STRESS-STRAIN-TIME RELATIONS, TANTALUM ALLOYS, TEMPERATURE DEPENDENCE

**N80-33555\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LONG-TIME CREEP BEHAVIOR OF THE NIOBIUM ALLOY C-103**

R. H. TITRAN and W. D. KLOPP Oct. 1980 12 p refs

(NASA-TP-1727; E-224) Avail: NTIS HC A02/MF A01 CSCL 11F

CREEP PROPERTIES, NIOBIUM ALLOYS, TEMPERATURE EFFECTS

**N81-16210\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF ERODANT PARTICLE SHAPE AND VARIOUS HEAT TREATMENTS ON EROSION RESISTANCE OF PLAIN CARBON STEEL**

J. SALIK and D. H. BUCKLEY Jan. 1981 10 p refs

(NASA-TP-1755; E-326) Avail: NTIS HC A02/MF A01 CSCL 11F

CARBON STEELS, EROSION, HEAT TREATMENT, IMPACT RESISTANCE, METAL SURFACES, SHAPES, TRIBOLOGY

**N81-19273\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CREEP AND RESIDUAL MECHANICAL PROPERTIES OF CAST SUPERALLOYS AND OXIDE DISPERSION STRENGTHENED ALLOYS**

J. D. WHITTENBERGER Feb. 1981 69 p refs

(NASA-TP-1781; E-472) Avail: NTIS HC A04/MF A01 CSCL 11F

CREEP PROPERTIES, FATIGUE TESTS, HEAT RESISTANT ALLOYS, MECHANICAL PROPERTIES

## 26 METALLIC MATERIALS

**N81-20245\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EFFECTS OF GEOMETRIC VARIABLES ON RUB CHARACTERISTICS OF TI-6AL-4V**  
 R. C. BILL, J. WOLAK (Washington Univ., Seattle), and D. W. WISANDER Apr. 1981 21 p refs Prepared in cooperation with Army Aviation Research and Development Command, Cleveland, Ohio  
 (NASA-TP-1835; AVRADCOM-TR-80-C-19; E-449) Avail: NTIS HC A02/MF A01 CSCL 11F  
 ALUMINUM ALLOYS, BLADE TIPS, TITANIUM ALLOYS, VANADIUM ALLOYS, WEAR

**N82-20291\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**FRICTION AND WEAR OF IRON IN CORROSIVE METAL**  
 G. W. P. RENGSTORFF, K. MIYOSHI, and D. H. BUCKLEY Mar. 1982 18 p refs  
 (NASA-TP-1985; NAS 1.60:1985; E-638) Avail: NTIS HC A02/MF A01 CSCL 11F  
 COEFFICIENT OF FRICTION, CORROSION TESTS, FRICTION, IRON, METAL SURFACES, SLIDING, WEAR TESTS

**N82-21298\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EFFECT OF ALUMINUM PHOSPHATE ADDITIONS ON COMPOSITION OF THREE-COMPONENT PLASMA-SPRAYED SOLID LUBRICANT**  
 T. P. JACOBSON and S. G. YOUNG Mar. 1982 19 p refs  
 (NASA-TP-1990; E-713; NAS 1.60:1990) Avail: NTIS HC A02/MF A01 CSCL 11F  
 ADDITIVES, PLASMA SPRAYING, POWDER METALLURGY, PROTECTIVE COATINGS, SELF LUBRICATION

**N82-21300\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**FRICTION WEAR AND AUGER ANALYSIS OF IRON IMPLANTED WITH 1.5-MEV NITROGEN IONS**  
 J. FERRANTE and W. R. JONES, JR. Mar. 1982 14 p refs  
 (NASA-TP-1989; E-678; NAS 1.60:1989) Avail: NTIS HC A02/MF A01 CSCL 11F  
 ION IMPLANTATION, IRON, NITROGEN IONS, SLIDING FRICTION, WEAR

**N82-21301\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**FRICTION AND SURFACE CHEMISTRY OF SOME FERROUS-BASE METALLIC GLASSES**  
 K. MIYOSHI and D. H. BUCKLEY Mar. 1982 14 p refs  
 (NASA-TP-1991; E-919; NAS 1.60:1991) Avail: NTIS HC A02/MF A01 CSCL 11F  
 AMORPHOUS MATERIALS, FERROUS METALS, FRICTION, METALLIC GLASSES

**N82-22349\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**SURFACE CHEMISTRY, MICROSTRUCTURE AND FRICTION PROPERTIES OF SOME FERROUS-BASE METALLIC GLASSES AT TEMPERATURES TO 750 C**  
 K. MIYOSHI and D. H. BUCKLEY Apr. 1982 16 p refs  
 (NASA-TP-2006; E-1001; NAS 1.60:2006) Avail: NTIS HC A02/MF A01 CSCL 11B  
 FRICTION FACTOR, METALLIC GLASSES, MICROSTRUCTURE, SLIDING FRICTION

**N83-15413\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**UNIVERSAL APPROACH TO ANALYSIS OF CAVITATION AND LIQUID-IMPINGEMENT EROSION DATA**  
 P. V. RAO and S. G. YOUNG Nov. 1982 39 p refs  
 (NASA-TP-2061; E-1087; NAS 1.60:2061) Avail: NTIS HC A03/MF A01 CSCL 20D  
 CAVITATION CORROSION, EROSION, IMPINGEMENT

**N83-16491\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**AN ELECTROCHEMICAL METHOD FOR DETERMINING HYDROGEN CONCENTRATIONS IN METALS AND SOME APPLICATIONS**  
 M. D. DANFORD Jan. 1983 18 p refs  
 (NASA-TP-2113; NAS 1.60:2113) Avail: NTIS HC A02/MF A01 CSCL 11F  
 CORROSION, ELECTROLYSIS, ELECTROPLATING, HYDROGEN EMBRITTLEMENT

**N83-16492\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**OPTICAL OBSERVATIONS OF UNIDIRECTIONAL SOLIDIFICATION IN MICROGRAVITY**  
 M. H. JOHNSTON, R. B. OWEN, and R. E. SHURNEY Jan. 1983 28 p refs  
 (NASA-TP-2110; NAS 1.60:2110) Avail: NTIS HC A03/MF A01 CSCL 11F  
 AMMONIUM CHLORIDES, REDUCED GRAVITY, SOLIDIFICATION, TEMPERATURE PROFILES, WATER

**N83-18895\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**A POTENTIAL-ENERGY SCALING MODEL TO SIMULATE THE INITIAL STAGES OF THIN-FILM GROWTH**  
 J. H. HEINBOCKEL (Old Dominion Univ.), R. A. OUTLAW, and G. H. WALKER Feb. 1983 38 p refs  
 (NASA-TP-2102; L-15531; NAS 1.60:2102) Avail: NTIS HC A03/MF A01 CSCL 11F  
 CRYSTAL GROWTH, POTENTIAL ENERGY, SCALING LAWS, SOLAR ARRAYS, SOLID-SOLID INTERFACES, THIN FILMS

**N83-19889\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**ELEVATED TEMPERATURE BEHAVIOR OF SUPERPLASTICALLY FORMED/WELD-BRAZED TITANIUM COMPRESSION PANELS HAVING ADVANCED SHAPED STIFFENERS**  
 D. M. ROYSTER and T. T. BALES Mar. 1983 29 p refs  
 (NASA-TP-2123; L-15547; NAS 1.60:2123) Avail: NTIS HC A03/MF A01 CSCL 11F  
 SUPERPLASTICITY, TEMPERATURE EFFECTS, TITANIUM ALLOYS, WELDING

**N83-21110\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**SLIDING INDUCED CRYSTALLIZATION OF METALLIC GLASS**  
 K. MIYOSHI and D. H. BUCKLEY Mar. 1983 23 p refs  
 (NASA-TP-2140; E-1278; NAS 1.60:2140) Avail: NTIS HC A02/MF A01 CSCL 11F  
 AMORPHOUS MATERIALS, CRYSTALLIZATION, METALLIC GLASSES, PHOTOMICROGRAPHY, SLIDING FRICTION, WEAR TESTS

**N83-23419\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**X-RAY PHOTOELECTRON SPECTROSCOPY AND FRICTION STUDIES OF NICKEL-ZINC AND MANGANESE-ZINC FERRITES IN CONTACT WITH METALS**  
 K. MIYOSHI and D. H. BUCKLEY Apr. 1983 19 p refs  
 (NASA-TP-2163; E-1349; NAS 1.60:2163) Avail: NTIS HC A02/MF A01 CSCL 11F  
 FERRITES, FRICTION, MANGANESE, NICKEL, SLIDING FRICTION, SPECTROSCOPIC ANALYSIS, ZINC

**N83-24640\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**NITRIDING OF TITANIUM AND TITANIUM: 8 PERCENT ALUMINUM, 1 PERCENT MOLYBDENUM, 1 PERCENT VANADIUM ALLOY WITH AN ION-BEAM SOURCE**

A. GILL (Ben Gurion Univ. of the Negev) Apr. 1983 11 p refs (NASA-TP-2149; E-1227; NAS 1.60:2149) Avail: NTIS HC A02/MF A01 CSCL 11F

ARGON, HARDENING (MATERIALS), ION BEAMS, NITRIDING, NITROGEN, TITANIUM NITRIDES, WEAR INHIBITORS

**N83-24641\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MORPHOLOGY OF AN ALUMINUM ALLOY ERODED BY A JET OF ANGULAR PARTICLES IMPINGING AT NORMAL INCIDENCE**

P. V. RAO, S. G. YOUNG (NASA. Kennedy Space Center), and D. H. BUCKLEY May 1983 15 p refs (NASA-TP-2139; E-1166; NAS 1.60:2139) Avail: NTIS HC A02/MF A01 CSCL 11F

ALUMINUM ALLOYS, EROSION, JET IMPINGEMENT, MORPHOLOGY, PARTICLE LADEN JETS, WEAR

**N83-32908\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TIME DEPENDENCE OF SOLID-PARTICLE IMPINGEMENT EROSION OF AN ALUMINUM ALLOY**

P. VEERABHADRARAO and D. H. BUCKLEY Aug. 1983 24 p refs Presented at 6th Intern. Conf. on Erosion by Liquid and Solid Impact, Cambridge, England, 4-8 Sep. 1983 (NASA-TP-2169; E-1381; NAS 1.60:2169) Avail: NTIS HC A02/MF A01 CSCL 11F

ALUMINUM ALLOYS, BEADS, EROSION, GLASS, JET IMPINGEMENT, VOLUME

**N83-34019\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND HARDNESS OF GOLD FILMS DEPOSITED BY ION PLATING AND EVAPORATION**

K. MIYOSHI, T. SPALVINS, and D. H. BUCKLEY Aug. 1983 10 p refs (NASA-TP-2207; E-1528; NAS 1.60:2207) Avail: NTIS HC A02/MF A01 CSCL 11F

EVAPORATION, GOLD, HARDNESS, ION PLATING, METAL FILMS, SLIDING FRICTION

**N83-35100\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FABRICATION AND EVALUATION OF COLD/FORMED/WELD-BRAZED BETA-TITANIUM SKIN-STIFFENED COMPRESSION PANELS**

D. M. ROYSTER, T. T. BALES, R. C. DAVIS, and H. R. WIAIT (Kentron International, Inc., Hampton, Va.) Sep. 1983 28 p refs (NASA-TP-2201; L-15634; NAS 1.60:2201) Avail: NTIS HC A03/MF A01 CSCL 11F

BETA FACTOR, COLD WORKING, PANELS, STIFFENING, TEMPERATURE EFFECTS, TITANIUM ALLOYS

**N84-13263\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**GALVANIC COUPLING BETWEEN D6AC STEEL, 6061-T6 ALUMINUM, INCONEL 718 AND GRAPHITE-EPOXY COMPOSITE MATERIAL: CORROSION OCCURRENCE AND PREVENTION**

M. D. DANFORD and R. H. HIGGINS Dec. 1983 18 p refs (NASA-TP-2236; NAS 1.60:2236) Avail: NTIS HC A02/MF A01 CSCL 11F

ALUMINUM ALLOYS, CORROSION PREVENTION, ELECTROCHEMICAL CORROSION, GRAPHITE-EPOXY COMPOSITES, INCONEL (TRADEMARK), SOLID-SOLID INTERFACES, STEELS

**N84-17350\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PRELIMINARY STUDY OF THERMOMECHANICAL FATIGUE OF POLYCRYSTALLINE MAR-M 200**

R. C. BILL (USAAVSCOM Research and Technology Labs.), M. J. VERRILLI (Northwestern Univ.), M. A. MCGAW, and G. R. HALFORD Feb. 1984 17 p refs (NASA-TP-2280; E-1795; NAS 1.60:2280; AVSCOM-TR-83-C-6) Avail: NTIS HC A02/MF A01 CSCL 11F

COBALT ALLOYS, FATIGUE TESTS, HEAT RESISTANT ALLOYS, METAL FATIGUE, THERMAL CYCLING TESTS, THERMAL FATIGUE

**N84-18370\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYSIS OF THERMOELECTRIC PROPERTIES OF HIGH-TEMPERATURE COMPLEX ALLOYS OF NICKEL-BASE, IRON-BASE AND COBALT-BASE GROUPS**

R. HOLANDA Jan. 1984 23 p refs (NASA-TP-2278; E-1854; NAS 1.60:2278) Avail: NTIS HC A02/MF A01 CSCL 11F

COBALT ALLOYS, HEAT RESISTANT ALLOYS, HIGH TEMPERATURE RESEARCH, IRON ALLOYS, NICKEL ALLOYS, THERMOELECTRICITY

**N84-21716\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF IRON IN SULFURIC ACID**

G. W. P. RENGSTORFF (Toledo Univ.), K. MIYOSHI, and D. H. BUCKLEY Apr. 1983 22 p refs (NAG3-276)

(NASA-TP-2289; E-1635; NAS 1.60:2289) Avail: NTIS HC A02/MF A01 CSCL 11F

CORROSION, IRON, SLIDING FRICTION, SULFURIC ACID, TRIBOLOGY, WEAR TESTS

**N84-21721\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF NICKEL IN SULFURIC ACID**

G. W. P. RENGSTORFF (Toledo Univ., Ohio), K. MIYOSHI, and D. H. BUCKLEY Apr. 1984 17 p refs (NAG3-276)

(NASA-TP-2290; E-1817; NAS 1.60:2290) Avail: NTIS HC A02/MF A01 CSCL 11F

CORROSION, METAL SURFACES, NICKEL, SLIDING FRICTION, SULFURIC ACID, TRIBOLOGY, WEAR TESTS

**N84-23750\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FRACTURE TEMPERATURE AND FLAW GROWTH IN NITRONIC 40 AT CRYOGENIC TEMPERATURES**

M. S. DOMACK May 1984 46 p refs (NASA-TP-2312; L-15722; NAS 1.60:2312) Avail: NTIS HC A03/MF A01 CSCL 11F

AUSTENITIC STAINLESS STEELS, CRACK PROPAGATION, FRACTURE STRENGTH, LOW TEMPERATURE TESTS, STRESS ANALYSIS, WIND TUNNEL MODELS

**N84-26783\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF ALLOY COMPOSITION ON CYCLIC FLAME HOT-CORROSION ATTACK OF CAST NICKEL-BASE SUPERALLOYS AT 900 DEG C**

D. L. DEADMORE Jul. 1984 30 p refs (NASA-TP-2338; E-2009; NAS 1.60:2338) Avail: NTIS HC A03/MF A01 CSCL 11F

CHEMICAL COMPOSITION, COBALT ALLOYS, CORROSION TESTS, HEAT RESISTANT ALLOYS, HOT CORROSION, NICKEL ALLOYS

## 26 METALLIC MATERIALS

**N84-28958\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**CHEMICAL MECHANISMS AND REACTION RATES FOR THE INITIATION OF HOT CORROSION OF IN-738**  
G. C. FRYBURG, F. J. KOHL, and C. A. STEARNS Jul. 1984 34 p Submitted for publication  
(NASA-TP-2319; E-1847; NAS 1.60:2319) Avail: NTIS HC A03/MF A01 CSCL 11F  
CHEMICAL REACTIONS, HEAT RESISTANT ALLOYS, HOT CORROSION, NICKEL ALLOYS, REACTION KINETICS

**N84-28965\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EROSION OF IRON-CHROMIUM ALLOYS BY GLASS PARTICLES**  
J. SALIK and D. H. BUCKLEY Jul. 1984 10 p refs  
(NASA-TP-2354; E-1615; NAS 1.60:2354) Avail: NTIS HC A02/MF A01 CSCL 11F  
BEADS, CHEMICAL COMPOSITION, CHROMIUM, EROSION, FRICTION, HARDNESS, IRON ALLOYS

**N84-31349\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EMPIRICAL RELATIONS FOR CAVITATION AND LIQUID IMPINGEMENT EROSION PROCESSES**  
P. V. RAO and D. H. BUCKLEY Aug. 1984 27 p refs Submitted for publication  
(NCC3-21)  
(NASA-TP-2339; E-1872; NAS 1.60:2339) Avail: NTIS HC A03/MF A01 CSCL 11F  
CAVITATION CORROSION, EROSION, JET IMPINGEMENT, MATHEMATICAL MODELS, METAL SURFACES

**N84-34589\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**FUNDAMENTALS OF ALLOY SOLIDIFICATION APPLIED TO INDUSTRIAL PROCESSES**  
Washington Sep. 1984 185 p refs Conf. held in Cleveland, 12-13 Sep. 1984 Sponsored in part by Case Western Reserve Univ.  
(NASA-CP-2337; E-2235; NAS 1.55:2337) Avail: NTIS HC A09/MF A01 CSCL 11F  
CONFERENCES, CRYSTAL GROWTH, LOW GRAVITY MANUFACTURING, METALS, SOLIDIFICATION, SPACE SHUTTLE PAYLOADS

**N85-13006\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EFFECT OF HUMIDITY ON FRETTING WEAR OF SEVERAL PURE METALS**  
H. GOTO (Cleveland State Univ., Ohio) and D. H. BUCKLEY Dec. 1984 12 p refs  
(NASA-TP-2403; E-2184; NAS 1.60:2403) Avail: NTIS HC A02/MF A01 CSCL 11F  
FRETTING, HUMIDITY, METALS, WEAR

**N85-21323\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EFFECTS OF CHROMIUM AND ALUMINUM ON MECHANICAL AND OXIDATION PROPERTIES OF IRON-NICKEL-BASE SUPERALLOYS BASED ON CG-27**  
S. R. SCHUON Mar. 1985 26 p refs Presented at the TMS-AIME Fall Meeting, Detroit, 17-20 Sep. 1984  
(NASA-TP-2443; E-2320; NAS 1.60:2443) Avail: NTIS HC A03/MF A01 CSCL 11F  
ALUMINUM, CHROMIUM, IRON ALLOYS, MECHANICAL PROPERTIES, OXIDATION, TENSILE STRENGTH

**N85-22662\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**AN ELECTROCHEMICAL STUDY OF THE CORROSION BEHAVIOR OF PRIMER COATED 2219-T87 ALUMINUM**  
M. D. DANFORD and R. H. HIGGINS Apr. 1985 27 p refs  
(NASA-TP-2459; NAS 1.60:2459) Avail: NTIS HC A03/MF A01 CSCL 11F  
ALUMINUM, CORROSION TESTS, ELECTROCHEMICAL CORROSION, PRIMERS (COATINGS)

**N86-12295\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**AN UPDATE OF THE TOTAL-STRAIN VERSION OF SRP**  
J. F. SALTSMAN and G. R. HALFORD Oct. 1985 27 p refs Presented at the Symp. on Low Cycle Fatigue: Direc. for the Future, Lake George, N.Y., 30 Sep. - 4 Oct. 1985; sponsored by American Society for Testing and Materials, American Inst. of Mining, Metallurgical and Petroleum Engineers, and American Society for Metals  
(NASA-TP-2499; E-2575; NAS 1.60:2499) Avail: NTIS HC A03/MF A01 CSCL 11F  
CREEP PROPERTIES, FATIGUE (MATERIALS), NICKEL, PREDICTION ANALYSIS TECHNIQUES, STRAIN RATE

**N86-13406\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**FABRICATION AND EVALUATION OF SUPERPLASTICALLY FORMED/WELD-BRAZED CORRUGATED COMPRESSION PANELS WITH BEADED WEBS**  
D. M. ROYSTER, R. C. DAVIS, J. M. SHINN, JR., T. T. BALES, and H. R. WIANT Nov. 1985 31 p refs  
(NASA-TP-2512; L-15988; NAS 1.60:2512) Avail: NTIS HC A03/MF A01 CSCL 11F  
BEADS, BRAZING, COMPRESSION LOADS, CORRUGATED PLATES, EVALUATION, FABRICATION, FORMING TECHNIQUES, PANELS, SUPERPLASTICITY, TITANIUM ALLOYS, WEBS (SUPPORTS), WELDED JOINTS

**N86-26412\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**OXIDATION AND EMITTANCE OF SUPERALLOYS IN HEAT SHIELD APPLICATIONS**  
K. E. WIEDEMANN (Analytical Services and Materials, Inc., Hampton, Va.), R. K. CLARK, and J. UNNAM Jun. 1986 20 p Presented at the TMS-AIME Fall Meeting, Toronto, Ontario, 13-17 Oct. 1985  
(NASA-TP-2578; L-16104; NAS 1.60:2578) Avail: NTIS HC A02/MF A01 CSCL 11F  
ALUMINUM OXIDES, EMITTANCE, HEAT RESISTANT ALLOYS, HEAT SHIELDING, OXIDATION, OXIDE FILMS, REENTRY SHIELDING, SPACECRAFT CONSTRUCTION MATERIALS, WIND TUNNEL TESTS

**N86-26413\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**ANALYSIS OF THE PHYSICAL ATOMIC FORCES BETWEEN NOBLE GAS ATOMS, ALKALI IONS AND HALOGEN IONS**  
J. W. WILSON, J. H. HEINBOCKEL (Old Dominion Univ., Hampton, Va.), and R. A. OUTLAW Jun. 1986 37 p  
(NASA-TP-2568; L-16093; NAS 1.60:2568) Avail: NTIS HC A03/MF A01 CSCL 07D  
CRYSTAL SURFACES, GAS-SOLID INTERACTIONS, HALITES, INTERATOMIC FORCES, INTERMOLECULAR FORCES, RARE GASES

**N86-30837\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THE VARIATION OF CORROSION POTENTIAL WITH TIME FOR COATED METAL SURFACES**

M. D. DANFORD and W. W. KNOCKEMUS (Huntingdon Coll., Montgomery, Ala.) Sep. 1986 27 p  
(NASA-TP-2636; NAS 1.60:2636) Avail: NTIS HC A03/MF A01 CSCL 11F

CORROSION RESISTANCE, ELECTROCHEMISTRY, PRIMERS (COATINGS), PROTECTIVE COATINGS

## 27

## NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

**N77-32312\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR BEHAVIOR OF SINGLE-CRYSTAL SILICON CARBIDE IN CONTACT WITH TITANIUM**

K. MIYOSHI and D. H. BUCKLEY Sep. 1977 24 p refs  
(NASA-TP-1035; E-9067) Avail: NTIS HC A02/MF A01 CSCL 11G

SILICON CARBIDES, SLIDING FRICTION, TITANIUM, WEAR

**N77-33348\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**X-RAY PHOTOELECTRON SPECTROSCOPY STUDY OF RADIOFREQUENCY-SPUTTERED TITANIUM, CARBIDE, MOLYBDENUM CARBIDE, AND TITANIUM BORIDE COATINGS AND THEIR FRICTION PROPERTIES**

W. A. BRAINARD and D. R. WHEELER Oct. 1977 21 p refs  
(NASA-TP-1033; E-9102) Avail: NTIS HC A02/MF A01 CSCL 11G

FRICTION FACTOR, SPUTTERING, X RAY SPECTROSCOPY

**N77-33350\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND DEFORMATION BEHAVIOR OF SINGLE-CRYSTAL SILICON CARBIDE**

K. MIYOSHI (Kanazawa Univ., Kanazawa, Japan) and D. H. BUCKLEY Oct. 1977 22 p refs  
(NASA-TP-1053; E-9121) Avail: NTIS HC A02/MF A01 CSCL 20B

CRYSTAL SURFACES, ELASTIC DEFORMATION, SILICON CARBIDES, SLIDING FRICTION

**N78-10295\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF SINGLE-CRYSTAL AND POLYCRYSTALLINE MAGANESE-ZINC FERRITE IN CONTACT WITH VARIOUS METALS**

K. MIYOSHI (Kanazawa Univ.) and D. H. BUCKLEY 1977 28 p refs  
(NASA-TP-1059) Avail: NTIS HC A03/MF A01 CSCL 20B

FERRITES, METAL COMPOUNDS, POLYCRYSTALS, SINGLE CRYSTALS, SLIDING FRICTION, WEAR

**N78-12222\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTIVENESS OF VARIOUS ORGANOMETALLICS AS ANTIWEAR ADDITIVES IN MINERAL OIL**

D. H. BUCKLEY Nov. 1977 20 p refs  
(NASA-TP-1096) Avail: NTIS HC A02/MF A01 CSCL 11H

ADDITIVES, COEFFICIENT OF FRICTION, MINERAL OILS, ORGANOMETALLIC COMPOUNDS

**N78-12223\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EVALUATION OF A LOW-DENSITY POLYIMIDE FOAM IN A DYNAMIC, HIGH TEMPERATURE ENVIRONMENT**

C. M. PITTMAN and R. D. BROWN Washington Dec. 1977 25 p refs  
(NASA-TP-1049; L-11739) Avail: NTIS HC A02/MF A01 CSCL 11G

AEROSPACE VEHICLES, FOAMS, HEAT SHIELDING, POLYIMIDE RESINS

**N78-15277\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF THERMAL EXPOSURE ON LUBRICATING PROPERTIES OF POLYIMIDE FILMS AND POLYIMIDE-BONDED GRAPHITE FLUORIDE FILMS**

R. L. FUSARO Jan. 1978 26 p refs  
(NASA-TP-1125; D-9179) Avail: NTIS HC A03/MF A01 CSCL 11G

FLUORIDES, GRAPHITE, LUBRICANTS, POLYIMIDES, TEMPERATURE EFFECTS, THIN FILMS

**N78-15278\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF POLYETHYLENE OXIDE POLYMER HAVING A RANGE OF MOLECULAR WEIGHTS**

D. H. BUCKLEY Jan. 1978 17 p refs  
(NASA-TP-1129; E-9261) Avail: NTIS HC A02/MF A01 CSCL 11G

COEFFICIENT OF FRICTION, MOLECULAR WEIGHT, OXIDES, POLYETHYLENES, WEAR

**N78-20336\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**X-RAY PHOTOELECTRON SPECTROSCOPY STUDY OF RADIOFREQUENCY-SPUTTERED REFRACTORY COMPOUND STEEL INTERFACES**

D. R. WHEELER and W. A. BRAINARD Feb. 1978 20 p refs  
(NASA-TP-1161; E-9374) Avail: NTIS HC A02/MF A01 CSCL 11G

METAL COATINGS, REFRACTORY MATERIALS, SPUTTERING, STEELS, X RAY SPECTROSCOPY

**N78-20337\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LUBRICATION AND FAILURE MECHANISMS OF GRAPHITE FLUORIDE FILMS**

R. L. FUSARO Apr. 1978 32 p refs  
(NASA-TP-1197; E-9346) Avail: NTIS HC A03/MF A01 CSCL 11H

FAILURE ANALYSIS, LUBRICATION, THIN FILMS, WEAR

**N78-20338\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF RADIOFREQUENCY-SPUTTERED BORIDES, SILICIDES, AND CARBIDES**

W. A. BRAINARD and D. R. WHEELER Apr. 1978 19 p refs  
(NASA-TP-1156; E-9384) Avail: NTIS HC A02/MF A01 CSCL 11G

BORIDES, CARBIDES, FRICTION, SILICIDES, WEAR

**N78-21294\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND METAL TRANSFER FOR SINGLE-CRYSTAL SILICON CARBIDE IN CONTACT WITH VARIOUS METALS IN VACUUM**

K. MIYOSHI (Kanazawa Univ., Japan) and D. H. BUCKLEY Apr. 1978 27 p refs  
(NASA-TP-1191; E-9307) Avail: NTIS HC A03/MF A01 CSCL 11G

CHEMICAL BONDS, COEFFICIENT OF FRICTION, INTERFACIAL ENERGY, SILICON CARBIDES, SINGLE CRYSTALS, TRANSITION METALS, VACUUM TESTS

## 27 NONMETALLIC MATERIALS

**N78-21295\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**WEAR OF SINGLE-CRYSTAL SILICON CARBIDE IN CONTACT WITH VARIOUS METALS IN VACUUM**

K. MIYOSHI and D. H. BUCKLEY Apr. 1978 24 p refs  
(NASA-TP-1198; E-9360) Avail: NTIS HC A02/MF A01 CSCL 11G

ALUMINUM, COPPER, SILICON CARBIDES, SINGLE CRYSTALS, SLIDING FRICTION, TRANSITION METALS, WEAR TESTS

**N78-22233\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**EVALUATION OF MATERIALS FOR HIGH PERFORMANCE SOLAR ARRAYS Status Report No. 1**

A. F. WHITAKER, C. F. SMITH, JR., C. L. PEACOCK, JR., and S. A. LITTLE Apr. 1978 41 p  
(NASA-TP-1220; M-252) Avail: NTIS HC A03/MF A01 CSCL 11G

IRRADIATION, OUTGASSING, SOLAR ARRAYS, VACUUM TESTS

**N78-25215\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PRESSURELESS SINTERED SIALONS WITH LOW AMOUNTS OF SINTERING AID**

A. ARIAS Jun. 1978 16 p refs  
(NASA-TP-1246; E-9522) Avail: NTIS HC A02/MF A01 CSCL 11G

ALUMINUM, CERAMICS, SILICON, SINTERING, YTTRIUM

**N78-28247\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF OXYGEN AND NITROGEN INTERACTIONS ON FRICTION OF SINGLE-CRYSTAL SILICON CARBIDE**

K. MIYOSHI and D. H. BUCKLEY (Kanazawa Univ., Japan) Aug. 1978 22 p refs  
(NASA-TP-1265; E-9424) Avail: NTIS HC A02/MF A01 CSCL 11G

COEFFICIENT OF FRICTION, FRICTION, NITROGEN, OXYGEN, SILICON CARBIDES, SINGLE CRYSTALS, SOLID-SOLID INTERFACES

**N78-30238\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF METALS WITH A SINGLE-CRYSTAL ABRASIVE GRIT OF SILICON CARBIDE: EFFECT OF SHEAR STRENGTH OF METAL**

K. MIYOSHI (Kanazawa Univ., Japan) and D. H. BUCKLEY Aug. 1978 27 p refs  
(NASA-TP-1293; E-9499) Avail: NTIS HC A03/MF A01 CSCL 11G

METAL SURFACES, SHEAR STRENGTH, SILICON CARBIDES, SLIDING FRICTION

**N79-13158\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LUBRICATION AND FAILURE MECHANISMS OF MOLYBDENUM DISULFIDE FILMS. 1: EFFECT OF ATMOSPHERE**

R. L. FUSARO Dec. 1978 29 p  
(NASA-TP-1343; E-9600) Avail: NTIS HC A03/MF A01 CSCL 11H

ATMOSPHERIC EFFECTS, COEFFICIENT OF FRICTION, FAILURE ANALYSIS, LUBRICANTS, MOLYBDENUM DISULFIDES

**N79-13159\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LUBRICATION AND FAILURE MECHANISMS OF MOLYBDENUM DISULFIDE FILMS. 2: EFFECT OF SUBSTRATE ROUGHNESS**

R. L. FUSARO Dec. 1978 30 p refs  
(NASA-TP-1379; E-9715) Avail: NTIS HC A03/MF A01 CSCL 11H

FAILURE ANALYSIS, LUBRICANTS, MOLYBDENUM DISULFIDES, SURFACE ROUGHNESS

**N79-15184\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF NITROGEN-CONTAINING PLASMA ON ADHERENCE, FRICTION, AND WEAR OF RADIOFREQUENCY-SPUTTERED TITANIUM CARBIDE COATINGS**

W. A. BRAINARD and D. R. WHEELER Jan. 1979 21 p refs  
(NASA-TP-1377; E-9681) Avail: NTIS HC A02/MF A01 CSCL 11D

ADHESION, COATINGS, FRICTION, NITROGEN, SPUTTERING, TITANIUM CARBIDES, WEAR TESTS

**N79-21204\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF OXYGEN-NITROGEN RATIO ON SINTERABILITY OF SIALONS**

A. ARIAS Apr. 1979 24 p refs  
(NASA-TP-1382; E-9814) Avail: NTIS HC A02/MF A01 CSCL 11B

CERAMICS, MASS RATIOS, NITROGEN, OXYGEN, SILICON COMPOUNDS, SINTERING

**N79-21205\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMAL STRESS ANALYSIS OF CERAMIC GAS-PATH SEAL COMPONENTS FOR AIRCRAFT TURBINES**

F. E. KENNEDY and R. C. BILL Apr. 1979 22 p refs  
Prepared in cooperation with Army Aviation Res. and Develop. Command, Cleveland  
(NASA-TP-1437; E-9770; AVRADCOM-TR-78-42) Avail: NTIS HC A02/MF A01 CSCL 11B

CERAMIC BONDING, GAS FLOW, LEAKAGE, THERMAL STRESSES, TURBINE BLADES

**N79-23216\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF STERILIZATION IRRADIATION ON FRICTION AND WEAR OF ULTRAHIGH-MOLECULAR-WEIGHT POLYETHYLENE**

W. R. JONES, JR., W. F. HADY, and A. CRUGNOLA (Lowell Univ.) May 1979 22 p refs  
(NASA ORDER C-8756)  
(NASA-TP-1462; E-9697) Avail: NTIS HC A02/MF A01 CSCL 07C

IRRADIATION, POLYETHYLENES, SLIDING FRICTION, STERILIZATION, WEAR

**N79-27308\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AUGER SPECTROSCOPY ANALYSIS OF LUBRICATION WITH ZINC DIALKYL DITHIOPHOSPHATE OF SEVERAL METAL COMBINATIONS IN SLIDING CONTACT**

D. H. BUCKLEY Jul. 1979 19 p  
(NASA-TP-1489; E-9909) Avail: NTIS HC A02/MF A01 CSCL 11H

AUGER SPECTROSCOPY, LUBRICATION, OIL ADDITIVES, ZINC COMPOUNDS



**N79-27309\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**MODULES OF RUPTURE AND OXIDATION RESISTANCE OF S12.55AL0.600.72N3.52 SIALON**

A. ARIAS Jul. 1979 15 p refs  
(NASA-TP-1490; E-9971) Avail: NTIS HC A02/MF A01 CSDL 11B

CERAMICS, CREEP RUPTURE STRENGTH, OXIDATION RESISTANCE, SILICON COMPOUNDS

**N79-29327\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**PLASMA-SPRAYED COATINGS FOR LUBRICATION OF A TITANIUM ALLOY IN AIR AT 430 DEG C**

H. E. SLINNEY and D. H. WISANDER Jul. 1979 14 p  
(NASA-TP-1509; E-9876) Avail: NTIS HC A02/MF A01 CSDL 11H

PLASMA SPRAYING, SELF LUBRICATING MATERIALS, SPRAYED COATINGS, TITANIUM ALLOYS

**N79-30380\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**ANISOTROPIC FRICTION, DEFORMATION, AND FRACTURE OF SINGLE-CRYSTAL SILICON CARBIDE AT ROOM TEMPERATURE**

K. MIYOSHI and D. H. BUCKLEY Aug. 1979 24 p refs  
(NASA-TP-1525; E-9988) Avail: NTIS HC A02/MF A01 CSDL 07D

ANISOTROPY, CRYSTAL SURFACES, FRACTURES (MATERIALS), PLASTIC DEFORMATION, SILICON CARBIDES, SLIDING FRICTION

**N79-30381\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**LUBRICATING AND WEAR MECHANISMS FOR A HEMISPHERE SLIDING ON POLYIMIDE-BONDED GRAPHITE FLUORIDE FILM**

R. L. FUSARO Aug. 1979 30 p refs  
(NASA-TP-1524; E-9965) Avail: NTIS HC A03/MF A01 CSDL 11H

COEFFICIENT OF FRICTION, GRAPHITE, LUBRICATION, SLIDING FRICTION, SOLID LUBRICANTS, WEAR

**N79-32359\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**EVALUATION AND AUGER ANALYSIS OF A ZINC-DIALKYL-DITHIOPHOSPHATE ANTIWEAR ADDITIVE IN SEVERAL DIESTER LUBRICANTS**

W. A. BRAINARD and J. FERRANTE Washington Oct. 1979 16 p refs  
(NASA-TP-1544; E-9944) Avail: NTIS HC A02/MF A01 CSDL 11H

ADDITIVES, AUGER SPECTROSCOPY, DIALLYL COMPOUNDS, LUBRICANT TESTS, SLIDING FRICTION, WEAR TESTS

**N80-11226\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**ELECTRON AND PHOTON ABSORPTION CALCULATIONS FOR A GRAPHITE/EPOXY COMPOSITE MODEL**

E. R. LONG, JR. Nov. 1979 33 p refs  
(NASA-TP-1568; L-13073) Avail: NTIS HC A02/MF A01 CSDL 11G

GRAPHITE-EPOXY COMPOSITES, LARGE SPACE STRUCTURES, RADIATION ABSORPTION

**N80-17220\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**LUBRICATION AND WEAR MECHANISMS OF POLYIMIDE-BONDED GRAPHITE FLUORIDE FILMS SUBJECTED TO LOW CONTACT STRESS**

R. L. FUSARO Jan. 1980 27 p refs  
(NASA-TP-1584; E-9990) Avail: NTIS HC A03/MF A01 CSDL 11H

GRAPHITE, LUBRICATION, POLYIMIDES, POLYMERIC FILMS, WEAR

**N80-18178\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**WEAR PARTICLES OF SINGLE-CRYSTAL SILICON CARBIDE IN VACUUM**

K. MIYOSHI and D. H. BUCKLEY Feb. 1980 24 p refs  
Submitted for publication  
(NASA-TP-1624; E-077) Avail: NTIS HC A02/MF A01 CSDL 20B

SILICON CARBIDES, SPALLING, WEAR

**N80-21532\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF OXIDE ADDITIONS AND TEMPERATURE ON SINTERABILITY OF MILLED SILICON NITRIDE**

A. ARIAS Apr. 1980 21 p refs  
(NASA-TP-1644; E-243) Avail: NTIS HC A02/MF A01 CSDL 11D

CESIUM OXIDES, MAGNESIUM OXIDES, SILICON NITRIDES, SINTERING, TEMPERATURE EFFECTS, YTTRIUM OXIDES

**N80-22493\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**STEADY-STATE WEAR AND FRICTION IN BOUNDARY LUBRICATION STUDIES**

W. R. LOOMIS and W. R. JONES, JR. May 1980 11 p refs  
(NASA-TP-1658; E-129) Avail: NTIS HC A02/MF A01 CSDL 11G

BOUNDARY LUBRICATION, STATIC FRICTION, WEAR

**N80-22494\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF IRON-BASE BINARY ALLOYS IN SLIDING CONTACT WITH SILICON CARBIDE IN VACUUM**

K. MIYOSHI and D. H. BUCKLEY May 1980 11 p refs  
(NASA-TP-1612; E-260) Avail: NTIS HC A02/MF A01 CSDL 11F

IRON ALLOYS, SILICON CARBIDES, SLIDING FRICTION, TRIBOLOGY, WEAR

**N80-23453\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**PRELIMINARY STUDY OF METHODS FOR PROVIDING THERMAL SHOCK RESISTANCE TO PLASMA-SPRAYED CERAMIC GAS-PATH SEALS**

R. C. BILL (AVRADCOM Res. and Technol. Labs.), D. W. WISANDER, and D. E. BREWE (AVRADCOM Res. and Technol. Labs.) May 1980 24 p refs  
(NASA-TP-1561; E-9941; AVRADCOM-TR-79-28) Avail: NTIS HC A02/MF A01 CSDL 11G

PLASMA SPRAYING, SHOCK RESISTANCE, THERMAL SHOCK

**N81-11214\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**POLYTETRAFLUOROETHYLENE TRANSFER FILM STUDIED WITH X-RAY PHOTOELECTRON SPECTROSCOPY**

D. R. WHEELER Nov. 1980 11 p refs  
(NASA-TP-1728; E-414) Avail: NTIS HC A02/MF A01 CSDL 11G

KNUDSEN FLOW, LOW DENSITY RESEARCH, MEAN FREE PATH, POLYTETRAFLUOROETHYLENE, THIN FILMS, X RAY SPECTROSCOPY

## 27 NONMETALLIC MATERIALS

**N81-14079\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CHANGES IN SURFACE CHEMISTRY OF SILICON CARBIDE (0001) SURFACE WITH TEMPERATURE AND THEIR EFFECT ON FRICTION**

K. MIYOSHI and D. H. BUCKLEY Nov. 1980 12 p refs (NASA-TP-1756; E-475) Avail: NTIS HC A02/MF A01 CSCL 07D

CRYSTAL STRUCTURE, FRICTION, SILICON CARBIDES, SURFACE REACTIONS

**N81-19300\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SURFACE CHEMISTRY AND FRICTION BEHAVIOR OF THE SILICON CARBIDE (0001) SURFACE AT TEMPERATURES TO 1500 DEG C**

K. MIYOSHI and D. H. BUCKLEY Mar. 1981 14 p refs (NASA-TP-1813; E-542) Avail: NTIS HC A02/MF A01 CSCL 11C

AUGER SPECTROSCOPY, FRICTION, PHOTOELECTRON SPECTROSCOPY, SILICON CARBIDES, SURFACE PROPERTIES

**N81-21193\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**STEADY-STATE BOUNDARY LUBRICATION WITH FORMULATED C-ETHERS TO 260 C**

W. R. LOOMIS Apr. 1981 16 p refs (NASA-TP-1812; E-480) Avail: NTIS HC A02/MF A01 CSCL 07C

BOUNDARY LUBRICATION, HIGH TEMPERATURE LUBRICANTS, POLYPHENYL ETHER

**N81-27282\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CORRELATION OF IDEAL AND ACTUAL SHEAR STRENGTHS OF METALS WITH THEIR FRICTION PROPERTIES**

K. MIYOSHI and D. H. BUCKLEY Jul. 1981 12 p refs (NASA-TP-1891; E-701) Avail: NTIS HC A02/MF A01 CSCL 11F

COEFFICIENT OF FRICTION, METALS, SHEAR STRENGTH, TRIBOLOGY

**N81-31365\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**DEVELOPMENT OF SILANE-HYDROLYSATE BINDER FOR UV-RESISTANT THERMAL CONTROL COATINGS**

W. J. PATTERSON Aug. 1981 23 p refs Original contains color illustrations (NASA-TP-1900; M-353) Avail: NTIS HC A02/MF A01 CSCL 11G

HYDROLYSIS, PROTECTIVE COATINGS, SILANES, TEMPERATURE CONTROL, THERMAL RESISTANCE

**N81-31366\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF YTTRIA ADDITIVES ON PROPERTIES OF PRESSURELESS-SINTERED SILICON NITRIDE**

A. ARIAS Sep. 1981 11 p refs (NASA-TP-1899; E-751) Avail: NTIS HC A02/MF A01 CSCL 11G

ADDITIVES, CERAMICS, MECHANICAL PROPERTIES, SILICON NITRIDES, SINTERING, SPALLING, YTTRIUM

**N81-33292\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**AVENUES AND INCENTIVES FOR COMMERCIAL USE OF A LOW-GRAVITY ENVIRONMENT**

R. L. BROWN and L. K. ZOLLER Sep. 1981 21 p (NASA-TP-1925; M-357; LA41/LA01) Avail: NTIS HC A02/MF A01 CSCL 22A

AEROSPACE ENVIRONMENTS, LOW GRAVITY MANUFACTURING, SPACE PROCESSING

**N81-33293\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**RELATIONSHIP BETWEEN THE IDEAL TENSILE STRENGTH AND THE FRICTION PROPERTIES OF METALS IN CONTACT WITH NONMETALS AND THEMSELVES Final Report**

K. MIYOSHI and D. H. BUCKLEY Washington NASA Sep. 1981 10 p refs (NASA-TP-1883; E-587) Avail: NTIS HC A02/MF A01 CSCL 11H

COEFFICIENT OF FRICTION, METALS, SLIDING FRICTION, SURFACE ENERGY, TENSILE STRENGTH, TRIBOLOGY

**N82-16239\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TRIBOLOGICAL CHARACTERISTICS OF A COMPOSITE TOTAL-SURFACE HIP REPLACEMENT Final Report**

W. R. JONES, JR., J. C. ROBERTS (Rensselaer Polytechnic Inst.), and F. F. LING (Rensselaer Polytechnic Inst.) Washington NASA Jan. 1982 17 p refs Presented at the ASME-ASLE Joint Lubrication Conf., New Orleans, 5-7 Oct. 1981 (NASA-TP-1853; E-709) Avail: NTIS HC A02/MF A01 CSCL 11H

COMPOSITE MATERIALS, E GLASS, EPOXY RESINS, TRIBOLOGY

**N82-19373\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TRIBOLOGICAL PROPERTIES AT 25 C OF SEVEN POLYIMIDE FILMS BONDED TO 440 C HIGH-TEMPERATURE STAINLESS STEEL**

R. L. FUSARO Feb. 1982 23 p refs (NASA-TP-1944; E-758) Avail: NTIS HC A02/MF A01 CSCL 07C

FRICTION, HIGH TEMPERATURE, POLYIMIDES, POLYMERIC FILMS, SOLID LUBRICANTS, STAINLESS STEELS, TRIBOLOGY, WEAR

**N82-19374\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SURFACE CHEMISTRY AND WEAR BEHAVIOR OF SINGLE-CRYSTAL SILICON CARBIDE SLIDING AGAINST IRON AT TEMPERATURES TO 1500 C IN VACUUM**

K. MIYOSHI and D. H. BUCKLEY Feb. 1982 14 p refs (NASA-TP-1947; E-654) Avail: NTIS HC A02/MF A01 CSCL 07C

CHEMICAL REACTIONS, IRON, SILICON CARBIDES, SINGLE CRYSTALS, SLIDING FRICTION, SURFACE PROPERTIES, WEAR

**N82-20316\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INFLUENCE OF MINERAL OIL AND ADDITIVES ON MICROHARDNESS AND SURFACE CHEMISTRY OF MAGNESIUM OXIDE (001) SURFACE**

K. MIYOSHI, H. SHIGAKI, and D. H. BUCKLEY Mar. 1982 11 p refs (NASA-TP-1986; E-975; NAS 1.60:1986) Avail: NTIS HC A02/MF A01 CSCL 11H

CRYSTAL SURFACES, MAGNESIUM OXIDES, MICROHARDNESS, MINERAL OILS, SURFACE REACTIONS

**N82-21332\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMAL AND OXIDATIVE DEGRADATION STUDIES OF FORMULATED C-ETHERS BY GEL-PERMEATION CHROMATOGRAPHY**

W. R. JONES, JR. and W. MORALES Mar. 1982 14 p refs (NASA-TP-1994; NAS 1.60:1994; E-976) Avail: NTIS HC A02/MF A01 CSCL 07D

ETHERS, LIQUID CHROMATOGRAPHY, LUBRICANTS, OXIDATION, THERMAL DEGRADATION

**N82-22366\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF ENVIRONMENT ON MICROHARDNESS OF MAGNESIUM OXIDE**

H. ISHIGAKI (Osaka Univ.) and D. H. BUCKLEY Apr. 1982 11 p refs

(NASA-TP-2002; E-916; NAS 1.60:2002) Avail: NTIS HC

A02/MF A01 CSCL 11B

ENVIRONMENTAL TESTS, HARDNESS TESTS, HYDROGEN CHLORIDES, MAGNESIUM OXIDES, MICROHARDNESS

**N82-32491\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**OCCURRENCE OF SPHERICAL CERAMIC DEBRIS IN INDENTATION AND SLIDING CONTACT**

K. MIYOSHI and D. H. BUCKLEY Aug. 1982 21 p refs

(NASA-TP-2048; E-1072; NAS 1.60:2048) Avail: NTIS HC

A02/MF A01 CSCL 11G

CERAMICS, DEBRIS, INDENTATION, SILICON CARBIDES, SLIDING FRICTION, WEAR TESTS

**N83-14269\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**EFFECT OF SLIDING SPEED AND CONTACT STRESS ON TRIBOLOGICAL PROPERTIES OF ULTRA-HIGH-MOLECULAR-WEIGHT POLYETHYLENE**

R. L. FUSARO Nov. 1982 22 p refs

(NASA-TP-2059; E-1060; NAS 1.60:2059) Avail: NTIS HC

A02/MF A01 CSCL 11G

DISKS (SHAPES), MOLECULAR WEIGHT, POLYETHYLENES, SLIDING FRICTION, STAINLESS STEELS, TRIBOLOGY, WEAR

**N83-16528\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**ANALYSIS OF A MIL-L-27502 LUBRICANT FROM A GAS-TURBINE ENGINE TEST BY SIZE-EXCLUSION CHROMATOGRAPHY**

W. R. JONES, JR. and W. MORALES Jan. 1983 15 p refs

(NASA-TP-2063; E-1075; NAS 1.60:2063) Avail: NTIS HC

A02/MF A01 CSCL 11H

DEGRADATION, ESTERS, GAS TURBINE ENGINES, HIGH TEMPERATURE LUBRICANTS

**N83-24695\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**SOLID SPHERICAL GLASS PARTICLE IMPINGEMENT STUDIES OF PLASTIC MATERIALS**

P. V. RAO (National Academy of Sciences - National Research Council, Washington, D.C.), S. G. YOUNG, and D. H. BUCKLEY 1983 19 p refs

(NASA-TP-2161; E-1122; NAS 1.60:2161) Avail: NTIS HC

A02/MF A01 CSCL 11I

BEADS, IMPACT DAMAGE, IMPINGEMENT, POLYCARBONATES, POLYMETHYL METHACRYLATE, POLYTETRAFLUOROETHYLENE

**N84-16334\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**FRICTION AND MORPHOLOGY OF MAGNETIC TAPES IN SLIDING CONTACT WITH NICKEL-ZINC FERRITE**

K. MIYOSHI, D. H. BUCKLEY, and B. BHUSHAN (IBM Corp.) Jan. 1984 18 p refs

(NASA-TP-2267; NAS 1.60:2267; E-1720) Avail: NTIS HC

A02/MF A01 CSCL 13I

COEFFICIENT OF FRICTION, DEFORMATION, MAGNETIC TAPES, NICKEL ALLOYS, SLIDING FRICTION, ZINC ALLOYS

**N84-18399\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**WATER-VAPOR EFFECTS ON FRICTION OF MAGNETIC TAPE IN CONTACT WITH NICKEL-ZINC FERRITE**

K. MIYOSHI and D. H. BUCKLEY Feb. 1984 10 p refs

(NASA-TP-2279; E-1768; NAS 1.60:2279) Avail: NTIS HC

A02/MF A01 CSCL 11G

FRICTION, HUMIDITY, MAGNETIC TAPES, NICKEL ALLOYS, PINS, ZINC ALLOYS

**N84-18400\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**BEAM IMPINGEMENT ANGLE EFFECTS ON SECONDARY ELECTRON EMISSION CHARACTERISTICS OF TEXTURED PYROLYTIC GRAPHITE**

A. N. CURREN and K. A. JENSEN Feb. 1984 16 p refs

(NASA-TP-2285; E-1886; NAS 1.60:2285) Avail: NTIS HC

A02/MF A01 CSCL 11G

ELECTRON EMISSION, GRAPHITE, MICROWAVE AMPLIFIERS, SECONDARY EMISSION, SPACE COMMUNICATION, TRAVELING WAVE TUBES

**N84-19564\*#** National Aeronautics and Space Administration.  
Marshall Space Flight Center, Huntsville, Ala.

**ULTRA-HIGH MOLECULAR WEIGHT SILPHENYLENE-SILOXANE POLYMERS**

W. J. PATTERSON, N. H. HUNDLEY, and L. M. LUDWICK Mar. 1984 19 p refs

(NASA-TP-2295; NAS 1.60:2295) Avail: NTIS HC A02/MF A01

CSCL 11B

COPOLYMERS, MOLECULAR WEIGHT, POLYMER CHEMISTRY, POLYMER PHYSICS, POLYMERIZATION

**N84-21740\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**OVERVIEW OF ZIRCONIA WITH RESPECT TO GAS TURBINE APPLICATIONS**

J. D. CAWLEY Mar. 1984 29 p refs

(NASA-TP-2286; E-1726; NAS 1.60:2286) Avail: NTIS HC

A02/MF A01 CSCL 11G

CHEMICAL PROPERTIES, GAS TURBINE ENGINES, MECHANICAL PROPERTIES, PHASE TRANSFORMATIONS, THERMAL CONDUCTIVITY, ZIRCONIUM OXIDES

**N84-23764\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**SIMULATION OF LUBRICATING BEHAVIOR OF A THIOETHER LIQUID LUBRICANT BY AN ELECTROCHEMICAL METHOD**

W. MORALES May 1984 12 p refs

(NASA-TP-2316; E-1808; NAS 1.60:2316) Avail: NTIS HC

A02/MF A01 CSCL 11H

ANIONS, CHEMICAL REACTIONS, ELECTROCHEMICAL CELLS, LUBRICANTS, SIMULATION

**N84-28989\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**SECONDARY ELECTRON EMISSION CHARACTERISTICS OF ION-TEXTURED COPPER AND HIGH-PURITY ISOTROPIC GRAPHITE SURFACES**

A. N. CURREN and K. A. JENSEN Jul. 1984 16 p refs

(NASA-TP-2342; E-2064; NAS 1.60:2342) Avail: NTIS HC

A02/MF A01 CSCL 11G

ACCUMULATORS, COPPER, ELECTRODES, MICROWAVE AMPLIFIERS, PYROLYTIC GRAPHITE, SECONDARY EMISSION, SURFACE PROPERTIES, TRAVELING WAVE TUBES

## 27 NONMETALLIC MATERIALS

**N84-31379\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **ADHESION BETWEEN POLYMERS AND EVAPORATED GOLD AND NICKEL FILMS**

Y. YAMADA, D. R. WHEELER, and D. H. BUCKLEY Aug. 1984 11 p refs

(NASA-TP-2360; E-2018; NAS 1.60:2360) Avail: NTIS HC A02/MF A01 CSCL 11B

ADHESION, ADHESION TESTS, GOLD COATINGS, METAL FILMS, NICKEL COATINGS, POLYETHYLENES

**N84-33590\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **FRICTION BEHAVIOR OF SILICON IN CONTACT WITH TITANIUM, NICKEL, SILVER AND COPPER**

H. MISHINA (Institute of Physical and Chemical Research) and D. H. BUCKLEY Sep. 1984 8 p refs

(NASA-TP-2362; E-2036; NAS 1.60:2362) Avail: NTIS HC A02/MF A01 CSCL 11G

CHEMICAL REACTIONS, FRICTION MEASUREMENT, FRICTION REDUCTION, SEMICONDUCTORS (MATERIALS), SLIDING FRICTION

**N85-13044\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **EFFECT OF BARRIER HEIGHT ON FRICTION BEHAVIOR OF THE SEMICONDUCTORS SILICON AND GALLIUM ARSENIDE IN CONTACT WITH PURE METALS**

H. MISHINA (Inst. of Physical and Chemical Research, Saitama, Japan) and D. H. BUCKLEY Dec. 1984 12 p refs

(NASA-TP-2405; E-2219; NAS 1.60:2405) Avail: NTIS HC A02/MF A01 CSCL 11B

GALLIUM ARSENIDES, METALS, SCHOTTKY DIODES, SEMICONDUCTORS (MATERIALS), SILICON, SLIDING FRICTION

**N85-13045\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **HIGH-TEMPERATURE EROSION OF PLASMA-SPRAYED, YTTRIA-STABILIZED ZIRCONIA IN A SIMULATED TURBINE ENVIRONMENT**

R. F. HANSCHUH Dec. 1984 19 p refs Prepared in cooperation with Army Research and Technology Labs., Cleveland

(NASA-TP-2406; E-2271; NAS 1.60:2406; AVSCOM-TR-84-C-17) Avail: NTIS HC A02/MF A01 CSCL 11B

EROSION, GAS TURBINE ENGINES, PLASMA SPRAYING, SEALS (STOPPERS), YTTRIUM, ZIRCONIUM

**N85-21359\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **HUMIDITY EFFECTS ON ADHESION OF NICKEL-ZINC FERRITE IN ELASTIC CONTACT WITH MAGNETIC TAPE AND ITSELF**

K. MIYOSHI, D. H. BUCKLEY, T. KUSAKA (Osaka Inst. of Technology), and C. MAEDA (Osaka Inst. of Technology) Mar. 1985 10 p refs

(NASA-TP-2449; E-2361; NAS 1.60:2449) Avail: NTIS HC A02/MF A01 CSCL 11G

ADHESION, FERRITES, HUMIDITY, MAGNETIC TAPES, NICKEL, ZINC

**N85-26990\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **FORMULATION/CURE TECHNOLOGY FOR ULTRAHIGH MOLECULAR WEIGHT SILPHENYLENE-SILOXANE POLYMERS**

N. H. HUNDLEY and W. J. PATTERSON May 1985 21 p refs

(NASA-TP-2476; NAS 1.60:2476) Avail: NTIS HC A02/MF A01 CSCL 11G

CURING, ELASTOMERS, MOLECULAR WEIGHT, POLYMERIZATION, SILOXANES

**N86-15394\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **TEXTURED CARBON ON COPPER: A NOVEL SURFACE WITH EXTREMELY LOW SECONDARY ELECTRON EMISSION CHARACTERISTICS**

A. N. CURREN and K. A. JENSEN Dec. 1985 16 p refs (NASA-TP-2543; E-2674; NAS 1.60:2543) Avail: NTIS HC A02/MF A01 CSCL 11G

BEAMS (RADIATION), CARBON, COPPER, ELECTRON EMISSION, IMPINGEMENT, MICROWAVE AMPLIFIERS, SECONDARY EMISSION, SUBSTRATES, SURFACE PROPERTIES, TEXTURES, TRAVELING WAVE TUBES

**N86-28194\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **MICROGRAVITY POLYMERS**

Jun. 1986 22 p Proceedings of a Workshop held in Cleveland, Ohio, 9 May 1985

(NASA-CP-2392; E-2707; NAS 1.55:2392) Avail: NTIS HC A02/MF A01 CSCL 11B

CHEMICAL ENGINEERING, GRAVITATIONAL EFFECTS, POLYMER CHEMISTRY, POLYMER PHYSICS, REDUCED GRAVITY

**N86-29040\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **NUMERICAL MODELING OF PHYSICAL VAPOR TRANSPORT IN A VERTICAL CYLINDRICAL AMPOULE, WITH AND WITHOUT GRAVITY**

T. L. MILLER Jul. 1986 21 p

(NASA-TP-2620; NAS 1.60:2620) Avail: NTIS HC A02/MF A01 CSCL 20D

COMPUTATIONAL FLUID DYNAMICS, CRYSTAL GROWTH, MATHEMATICAL MODELS, REDUCED GRAVITY, TRANSPORT PROPERTIES, VAPOR PHASE EPITAXY

## 28

## PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels.

**N78-13234\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **TRIPLE POINT DETERMINATIONS OF MONOMETHYLHYDRAZINE AND NITROGEN TETROXIDE, 2.2 PERCENT BY WEIGHT NITRIC OXIDE**

I. D. SMITH and P. M. DOOGE (Lockheed Electronics Co., Inc., Las Cruces, New Mexico) Nov. 1977 16 p refs (NASA-RP-1013; S-475) Avail: NTIS HC A02/MF A01 CSCL 21I

A series of tests was performed to ascertain the triple points of monomethylhydrazine and nitrogen tetroxide. A laboratory method indicated a triple point for monomethylhydrazine, but tests in a large vacuum chamber indicated that a triple point does not occur in spacelike conditions because the mono-methylhydrazine tends to supercool. Instead, an effective freezing point (with agitation) was obtained. New experimental values for liquid monomethylhydrazine vapor pressure were determined for temperatures from 275.2 to 207.6 K. The values were used to derive vapor pressure equations. Tentative values were obtained for the effective freezing point of nitrogen tetroxide spacelike conditions.

Author

**N78-19325\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**JET AIRCRAFT HYDROCARBON FUELS TECHNOLOGY**

J. P. LONGWELL, ed. 1978 64 p Workshop held at Cleveland, Ohio, 7-9 Jun. 1977  
(NASA-CP-2033; E-9457) Avail: NTIS HC A04/MF A01 CSCL 21D

AIRCRAFT FUELS, HYDROCARBON FUELS, JET AIRCRAFT, JET ENGINE FUELS

**N78-20351\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPUTER PROGRAM FOR OBTAINING THERMODYNAMIC AND TRANSPORT PROPERTIES OF AIR AND PRODUCTS OF COMBUSTION OF ASTM-A-1 FUEL AND AIR**

S. A. HIPPENSTEELE and R. S. COLLADAY Mar. 1978 56 p  
(NASA-TP-1160; E-9371) Avail: NTIS HC A04/MF A01 CSCL 21B

AIR, COMBUSTION PRODUCTS, COMPUTER PROGRAMS, FUEL COMBUSTION, THERMODYNAMIC PROPERTIES, TRANSPORT PROPERTIES

**N78-25236\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CATALYTIC DECOMPOSITION OF METHANOL FOR ONBOARD HYDROGEN GENERATION**

T. BRABBS Jun. 1978 47 p refs  
(NASA-TP-1247; E-9472) Avail: NTIS HC A03/MF A01 CSCL 21D

CATALYTIC ACTIVITY, DECOMPOSITION, METHYL ALCOHOL, WATER

**N79-16994\*#** National Aeronautics and Space Administration. Washington, D.C.

**LIQUID HYDROGEN AS A PROPULSION FUEL, 1945-1959**

J. L. SLOOP 1978 346 p refs  
(NASA-SP-4404) Avail: NTIS MF A01; HC SOD CSCL 21D

A historical review is presented on the research and development of liquid hydrogen for use as a propulsion fuel. The document is divided into three parts: Part 1 (1945-1950); Part 2 (1950-1957); and Part 3 (1957-1958), encompassing eleven topics. Two appendixes are included. Hydrogen Technology Through World War 2; and Propulsion Primer, Performance Parameters and Units. For individual titles, see N79-16995 through N79-17010.

**N79-28350\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AXIAL JET MIXING OF ETHANOL IN CYLINDRICAL CONTAINERS DURING WEIGHTLESSNESS**

J. C. AYDELOTT Jul. 1979 43 p refs  
(NASA-TP-1487; E-9937) Avail: NTIS HC A03/MF A01 CSCL 21D

CYLINDRICAL TANKS, ETHYL ALCOHOL, LIQUID ROCKET PROPELLANTS, MIXING, WEIGHTLESSNESS

**N80-14257\*#** National Bureau of Standards, Washington, D.C. Thermophysical Properties Div.

**THERMODYNAMIC PROPERTIES OF NITROGEN GAS DERIVED FROM MEASUREMENTS OF SOUND SPEED**

B. YOUNGLOVE and R. D. MCCARTY Washington NASA Dec. 1979 56 p refs  
(NASA ORDER L-55450-A; NASA ORDER L-69159-A)  
(NASA-RP-1051; NBSIR-79-1611; L-13308) Avail: NTIS HC A04/MF A01 CSCL 07D

A virial equation of state for nitrogen was determined by use of newly measured speed-of-sound data and existing pressure-density-temperature data in a multiproperty-fitting technique. The experimental data taken were chosen to optimize the equation of state for a pressure range of 0 to 10 atm and for a temperature range of 60 to 350 K. Comparisons are made for thermodynamic properties calculated both from the new equation and from existing equations of state. Author

**N80-21551\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MECHANICAL IMPACT TESTS OF MATERIALS IN OXYGEN EFFECTS OF CONTAMINATION**

P. M. ORDIN Washington Apr. 1980 36 p refs  
(NASA-TP-1571; E-047) Avail: NTIS HC A03/MF A01 CSCL 20K

ALUMINUM, CONTAMINATION, HIGH PRESSURE OXYGEN, IMPACT TESTS, STAINLESS STEELS, TEFLON (TRADEMARK)

**N81-24283\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF HYDROPROCESSING SEVERITY ON CHARACTERISTICS OF JET FUEL FROM OSCO 2 AND PARAHO DISTILLATES**

G. M. PROK, F. J. FLORES, and G. T. SENG Jun. 1981 20 p refs  
(NASA-TP-1768; E-617) Avail: NTIS HC A02/MF A01 CSCL 21D

FUEL PRODUCTION, FUEL TESTS, HYDROGENATION, JET ENGINE FUELS, SHALE OIL

**N81-29246\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE TESTS OF A GAS BLENDING SYSTEM BASED ON MASS-FLOW CONTROLLERS**

A. EVANS, JR. Aug. 1981 16 p refs  
(NASA-TP-1896; E-629) Avail: NTIS HC A02/MF A01 CSCL 21D

CHEMICAL ANALYSIS, EXHAUST GASES, MASS FLOW RATE, MIXING, PERFORMANCE TESTS

**N83-11340\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**RECENT TRENDS IN AVIATION TURBINE FUEL PROPERTIES**

R. FRIEDMAN Oct. 1982 33 p refs  
(NASA-TP-2056; E-1127; NAS 1.60:2056) Avail: NTIS HC A03/MF A01 CSCL 21D

CHEMICAL PROPERTIES, HYDROCARBON FUELS, JET ENGINE FUELS, TURBINE ENGINES

**N83-16545\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MODELING OF SPACE VEHICLE PROPELLANT MIXING**

J. C. AYDELOTT Jan. 1983 27 p refs  
(NASA-TP-2107; E-1275; NAS 1.60:2107) Avail: NTIS HC A03/MF A01 CSCL 21I

CRYOGENIC ROCKET PROPELLANTS, DIMENSIONAL ANALYSIS, FLUID DYNAMICS, JET MIXING FLOW, SPACECRAFT PROPULSION

**N83-22442\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AVIATION GASOLINES AND FUTURE ALTERNATIVES**

D. J. PATTERSON, ed. Washington May 1983 164 p refs  
Workshop held in Cleveland, Ohio, 3-5 Feb. 1981  
(NASA-CP-2267; E-1260; NAS 1.55:2267) Avail: NTIS HC A08/MF A01 CSCL 21D

AIRCRAFT FUELS, CIVIL AVIATION, CONFERENCES, FUEL SYSTEMS, GASOLINE

**N84-23774\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**GROUP-TYPE HYDROCARBON STANDARDS FOR HIGH-PERFORMANCE LIQUID CHROMATOGRAPHIC ANALYSIS OF MIDDISTILLATE FUELS**

D. A. OTTERSON and G. T. SENG May 1984 18 p refs  
(NASA-TP-2317; E-1931; NAS 1.60:2317) Avail: NTIS HC A02/MF A01 CSCL 21D

FUELS, HYDROCARBONS, LIQUID CHROMATOGRAPHY, PERFORMANCE TESTS, REFRACTIVITY, STANDARDS

**N85-31307\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **RAPID ESTIMATION OF CONCENTRATION OF AROMATIC CLASSES IN MIDDISTILLATE FUELS BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY**

D. A. OTTERSON and G. T. SENG Washington Jul. 1985 16 p refs

(NASA-TP-2495; E-2376; NAS 1.60:2495) Avail: NTIS HC A02/MF A01 CSCL 21D

FUEL TESTS, HYDROCARBON FUELS, LIQUID CHROMATOGRAPHY, QUANTITATIVE ANALYSIS, SULFURIC ACID

**N85-35307\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SOUND SPEED MEASUREMENTS IN LIQUID OXYGEN-LIQUID NITROGEN MIXTURES**

A. J. ZUCKERWAR and D. S. MAZEL (Old Dominion Univ.) Sep. 1985 22 p refs

(NASA-TP-2464; L-15965; NAS 1.60:2464) Avail: NTIS HC A02/MF A01 CSCL 21D

ACOUSTIC VELOCITY, FUEL CONTAMINATION, LIQUID NITROGEN, LIQUID OXYGEN, LIQUID PROPELLANT ROCKET ENGINES, ULTRASONICS

## 31

### **ENGINEERING (GENERAL)**

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

**N77-10230\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ADVANCES IN ENGINEERING SCIENCE, VOLUME 1**

1976 360 p refs Presented at the 13th Ann. Meeting of The Soc. of Eng. Sci., 1-3 Nov. 1976, Hampton, Va.; sponsored by JIAFS and George Washington Univ. 1 Vol.

(NASA-CP-2001-VOL-1) Avail: NTIS HC A16/MF A01 CSCL 13M

BONDING, CONFERENCES, CRACK PROPAGATION, STRESS ANALYSIS

**N77-10265\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ADVANCES IN ENGINEERING SCIENCE, VOLUME 2**

1976 457 p refs Presented at the 13th Ann. Meeting of Soc. of Eng. Sci., Hampton, Va., 1-3 Nov. 1976, sponsored by JIAFS and George Washington Univ. 4 Vol.

(NASA-CP-2001-VOL-2) Avail: NTIS HC A20/MF A01 CSCL 13M

COMPUTER PROGRAMMING, CONFERENCES, DYNAMIC STRUCTURAL ANALYSIS, FRACTURE MECHANICS, STRUCTURAL ENGINEERING

**N77-10305\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ADVANCES IN ENGINEERING SCIENCE, VOLUME 3**

1976 464 p refs Presented at the 13th Ann. Meeting of the Soc. of Eng. Sci., Hampton, Va., 1-3 Nov. 1976; sponsored by JIAFS and George Washington Univ. 4 Vol.

(NASA-CP-2001-VOL-3) Avail: NTIS HC A20/MF A01 CSCL 13M

ACOUSTICS, CONFERENCES, ENERGY TECHNOLOGY, ENGINEERING, ENVIRONMENT MODELS

**N77-10345\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ADVANCES IN ENGINEERING SCIENCE, VOLUME 4**

1976 521 p refs Presented at 13th Ann. Meeting of Soc. of Eng. Sci., Hampton, Va., 1-3 Nov. 1976; sponsored by JIAFS and George Washington Univ. 4 Vol.

(NASA-CP-2001-VOL-4) Avail: NTIS HC A22/MF A01 CSCL 13M

FINITE DIFFERENCE THEORY, FINITE ELEMENT METHOD, HEAT TRANSFER, HUMAN FACTORS ENGINEERING, SWEPT WINGS, THREE DIMENSIONAL BOUNDARY LAYER, TRANSONIC FLOW

**N77-30273\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **PROCEEDINGS OF THE ASPE/MSFC SYMPOSIUM ON ENGINEERING AND PRODUCTIVITY GAINS FROM SPACE TECHNOLOGY**

May 1977 279 p Conf. proc. held at Huntsville, Ala., 11-12 May 1977

(NASA-CP-2019) Avail: NTIS HC A13/MF A01 CSCL 05A

AEROSPACE ENGINEERING, CONFERENCES, ENERGY TECHNOLOGY, TECHNOLOGY TRANSFER

**N77-30296\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **TRANSFER OF MOLYBDENUM DISULFIDE TO VARIOUS METALS**

G. C. BARTON (Weber State College, Ogden, Utah) and S. V. PEPPER Aug. 1977 17 p refs

(NASA-TP-1019; E-8965) Avail: NTIS HC A02/MF A01 CSCL 07D

AUGER SPECTROSCOPY, METAL SURFACES, MOLYBDENUM DISULFIDES, STAINLESS STEELS

**N78-18252\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EVALUATION OF A LABORATORY TEST MODEL ANNULAR MOMENTUM CONTROL DEVICE**

N. J. GROOM and D. E. TERRAY Mar. 1978 23 p refs

(NASA-TP-1142; L-11968) Avail: NTIS HC A02/MF A01 CSCL 14B

ANGULAR MOMENTUM, CONTROL EQUIPMENT, MATHEMATICAL MODELS

**N78-22257\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **APPLIED ROUTH APPROXIMATION**

W. C. MERRILL Apr. 1978 40 p refs

(NASA-TP-1231; E-9114) Avail: NTIS HC A03/MF A01 CSCL 12B

APPROXIMATION, FREQUENCY MEASUREMENT, PRESSURE REGULATORS, ROCKET ENGINES, SCALE MODELS

**N80-20437\*#** National Aeronautics and Space Administration. Washington, D.C.

### **THE APOLLO SPACECRAFT: A CHRONOLOGY VOLUME 4, 21 JANUARY 1966 - 13 JULY 1974**

I. D. ERTEL, R. W. NEWKIRK, and C. G. BROOKS 1978 476 p refs

(NASA-SP-4009-VOL-4; LC-69-60008) Avail: NTIS MF A01; SOD HC CSCL 22B

This final volume of the chronology is divided into three parts: (1) preparation for flight, the accident, and investigation; (2) recovery, spacecraft redefinition, and the first manned flight; and (3) man circles the moon, the Eagle lands, and manned space exploration. Congressional documents, official correspondence, government and contractor reports, memoranda, working papers, and minutes of meetings were used as primary sources. A relatively few entries are based on press releases and newspaper and magazine articles.

A.R.H.

**N80-23495\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PROCEEDINGS OF THE 14TH AEROSPACE MECHANISMS SYMPOSIUM**

May 1980 327 p refs Symp. held at Hampton, Va., 1-2 May 1980; sponsored in part by Calif. Inst. of Tech. and Lockheed Missiles and Space Co.

(NASA-CP-2127; L-13610) Avail: NTIS HC A15/MF A01 CSCL 20K

AEROSPACE ENGINEERING, CONFERENCES, MECHANICAL ENGINEERING, SPACE TRANSPORTATION SYSTEM

**N81-14138\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**THE 11TH SPACE SIMULATION CONFERENCE**

A. C. BOND, ed. 1980 435 p refs Conf. held at Houston, Tex., 23-25 Sep. 1980

(NASA-CP-2150; S-508) Avail: NTIS HC A19/MF A01 CSCL 22A

CONFERENCES, DEFENSE COMMUNICATIONS SYSTEM (DCS), REUSABLE SPACECRAFT, SPACE SHUTTLE ORBITERS, SPACE SIMULATORS, SPACECRAFT CONTAMINATION

**N81-20311\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYSIS AND SIMULATION OF A MAGNETIC BEARING SUSPENSION SYSTEM FOR A LABORATORY MODEL ANNULAR MOMENTUM CONTROL DEVICE**

N. J. GROOM, C. T. WOOLLEY, and S. M. JOSHI (Vigyan Research Associates Inc.) Mar. 1981 38 p refs

(NASA-TP-1799; L-12403) Avail: NTIS HC A03/MF A01 CSCL 14B

ACTUATORS, COMPOSITE MATERIALS, COMPUTERIZED SIMULATION, MAGNETIC FLUX, MAGNETIC SUSPENSION, SPACECRAFT CONTROL

**N82-19390\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF VACUUM PROCESSING ON OUTGASSING WITHIN AN ORBITING MOLECULAR SHIELD**

R. A. OUTLAW Mar. 1982 14 p refs

(NASA-TP-1980; L-14987) Avail: NTIS HC A02/MF A01 CSCL 20H

GAS DENSITY, HYDROGEN, MOLECULAR SHIELDS, OUTGASSING, VACUUM EFFECTS

**N82-20357\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CRYOGENIC TECHNOLOGY, PART 1**

Mar. 1980 273 p refs Conf. held at Hampton, Va., 27-29 Nov. 1979

(NASA-CP-2122-PT-1; L-13547; NAS 1.55:2122-PT-1) Avail: NTIS HC A12/MF A01 CSCL 20L

CONFERENCES, CRYOGENIC EQUIPMENT, CRYOGENIC WIND TUNNELS, TRANSONIC WIND TUNNELS, WIND TUNNEL APPARATUS

**N82-20358\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CRYOGENIC TECHNOLOGY, PART 2**

Mar. 1980 159 p refs Conf. held at Hampton, Va., 27-29 Nov. 1979

(NASA-CP-2122-PT-2; L-13547; NAS 1.55:2122-PT-2) Avail: NTIS HC A08/MF A01 CSCL 20L

CONFERENCES, CRYOGENIC EQUIPMENT, CRYOGENIC WIND TUNNELS, TRANSONIC WIND TUNNELS, WIND TUNNEL APPARATUS

**N82-23344\*#** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

**THE 16TH AEROSPACE MECHANISMS SYMPOSIUM**

May 1982 343 p refs Proceedings of conf. held at Kennedy Space Center, Fla., 13-14 May 1982; sponsored in part by Calif. Inst. of Technology and Lockheed Missiles and Space Co., Inc., Sunnyvale

(NASA-CP-2221; NAS 1.55:2221) Avail: NTIS HC A15/MF A01 CSCL 12T

ACTUATORS, FASTENERS, LARGE SPACE STRUCTURES, LATCHES, PAYLOAD DEPLOYMENT & RETRIEVAL SYSTEM, REMOTE MANIPULATOR SYSTEM, SPACE SHUTTLE ORBITERS, SPACE TRANSPORTATION SYSTEM

**N83-32990\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**DESIGN GUIDE FOR HIGH PRESSURE OXYGEN SYSTEMS**

A. C. BOND, H. O. POHL, N. H. CHAFFEE, W. W. GUY, C. S. ALLTON, R. L. JOHNSTON, W. L. CASTNER, and J. S. STRADLING (White Sands Missile Range) Aug. 1983 83 p refs

(NASA-RP-1113; S-526; NAS 1.61:1113) Avail: NTIS HC A05/MF A01 CSCL 13I

A repository for critical and important detailed design data and information, hitherto unpublished, along with significant data on oxygen reactivity phenomena with metallic and nonmetallic materials in moderate to very high pressure environments is documented. This data and information provide a ready and easy to use reference for the guidance of designers of propulsion, power, and life support systems for use in space flight. The document is also applicable to designs for industrial and civilian uses of high pressure oxygen systems. The information presented herein are derived from data and design practices involving oxygen usage at pressures ranging from about 20 psia to 8000 psia equal with thermal conditions ranging from room temperatures up to 500 F.

S.L.

**N84-15327\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**REFRIGERATION FOR CRYOGENIC SENSORS**

M. G. GASSER, ed. Washington Dec. 1983 430 p refs Conf. held in Greenbelt, Md., 7-8 Dec. 1982

(NASA-CP-2287; REPT-83F5158; NAS 1.55:2287) Avail: NTIS HC A19/MF A01 CSCL 20L

CONFERENCES, CRYOGENIC COOLING, REFRIGERATORS

**N84-33613\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ENGINEERING AND DESIGN PROPERTIES OF THALLIUM-DOPED SODIUM IODIDE AND SELECTED PROPERTIES OF SODIUM-DOPED CESIUM IODIDE**

K. FORREST, C. HAEHNER, T. HESLIN, M. MAGIDA, J. UBER, S. FREIMAN (NBS), G. HICHO (NBS), and R. POLVANI (NBS) Sep. 1984 74 p refs

(NASA-RP-1131; NAS 1.61:1131; REPT-84F0257) Avail: NTIS HC A04/MF A01 CSCL 20K

Mechanical and thermal properties, not available in the literature but necessary to structural design, using thallium doped sodium iodide and sodium doped cesium iodide were determined to be coefficient of linear thermal expansion, thermal conductivity, thermal shock resistance, heat capacity, elastic constants, ultimate strengths, creep, hardness, susceptibility to subcritical crack growth, and ingot variation of strength. These properties were measured for single and polycrystalline materials at room temperature.

Author

## 31 ENGINEERING (GENERAL)

**N86-20586\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**DESIGN OF HIGH-QUALITY THIN-FILM GE SINGLE CRYSTALS BY PLASMA-ENHANCED CHEMICAL VAPOR DEPOSITION**

R. A. OUTLAW and P. HOPSON, JR. Feb. 1986 15 p refs  
(NASA-TP-2532; L-16011; NAS 1.60:2532) Avail: NTIS HC A02/MF A01 CSCL 20B

GERMANIUM, GROWTH, PLASMAS (PHYSICS), SINGLE CRYSTALS, THIN FILMS, VAPOR DEPOSITION

## 32

### COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

**N79-14275\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DESIGN OF A VIDEO TELECONFERENCE FACILITY FOR A SYNCHRONOUS SATELLITE COMMUNICATIONS LINK**

M. D. RICHARDSON Jan. 1979 20 p refs  
(NASA-TP-1376; E-9202) Avail: NTIS HC A02/MF A01 CSCL 17B

COMMUNICATION SATELLITES, DATA LINKS, TELECONFERENCING, VIDEO COMMUNICATION

**N82-15270\*#** Operations Research, Inc., Silver Spring, Md. Space Engineering and Communication Systems Div.

**PROPAGATION EFFECTS HANDBOOK FOR SATELLITE SYSTEMS DESIGN: A SUMMARY OF PROPAGATION IMPAIRMENTS ON 10 TO 100 GHZ SATELLITE LINKS WITH TECHNIQUES FOR SYSTEM DESIGN**

R. D. KAUL and R. G. WALLACE Dec. 1981 423 p refs  
(NASW-431)

(NASA-RP-1082; ORI-TR-1905) Avail: NTIS HC A18/MF A01 CSCL 14N

The major propagation effects experienced on Earth-space communications paths in the 10 to 100 GHz frequency range. Attenuation due to rain is dealt with in detail. For individual titles, see N82-15271 through N82-15276.

**N83-29491\*#** National Aeronautics and Space Administration, Washington, D.C.

**PROPAGATION EFFECTS HANDBOOK FOR SATELLITE SYSTEMS DESIGN. A SUMMARY OF PROPAGATION IMPAIRMENTS ON 10 TO 100 GHZ SATELLITE LINKS WITH TECHNIQUES FOR SYSTEM DESIGN**

L. J. IPPOLITO, R. D. KAUL, and R. G. WALLACE Jun. 1983 468 p refs Prepared in cooperation with Operations Research, Inc., Silver Spring, Md.  
(NASW-3644)

(NASA-RP-1082(03); NAS 1.61:1082(03); ORI-TR-1905) Avail: NTIS HC A20/MF A01 CSCL 20N

This Propagation Handbook provides satellite system engineers with a concise summary of the major propagation effects experienced on Earth-space paths in the 10 to 100 GHz frequency range. The dominant effect, attenuation due to rain, is dealt with in some detail, in terms of both experimental data from measurements made in the U.S. and Canada, and the mathematical and conceptual models devised to explain the data. In order to make the Handbook readily usable to many engineers, it has been arranged in two parts. Chapters 2-5 comprise the descriptive part. They deal in some detail with rain systems, rain and attenuation models, depolarization and experimental data. Chapters 6 and 7 make up the design part of the Handbook and may be used almost independently of the earlier chapters. In Chapter 6, the design techniques recommended for predicting propagation effects in Earth-space communications systems are presented. Chapter 7

addresses the questions of where in the system design process the effects of propagation should be considered, and what precautions should be taken when applying the propagation results. Author

**N84-13397\*#** National Aeronautics and Space Administration, Washington, D.C. Dept. of Electrical Engineering.

**PROPAGATION EFFECTS ON SATELLITE SYSTEMS AT FREQUENCIES BELOW 10 GHZ, A HANDBOOK FOR SATELLITE SYSTEMS DESIGN, 1ST EDITION**

W. L. FLOCK Dec. 1983 433 p refs

(NAS7-100; JPL-956249)

(NASA-RP-1108; NAS 1.61:1108) Avail: NTIS HC A19/MF A01 CSCL 20N

Satellite communications below about 6 GHz may need to contend with ionospheric effects, including Faraday rotation and ionospheric scintillation, which become increasingly significant with decreasing frequency. Scintillation is most serious in equatorial, auroral, and polar latitudes; even the 4 to 6 GHz frequency range turns out to be subject to scintillation to a significant degree of equatorial latitudes. Faraday rotation, excess range or time delay, phase advance, Doppler frequency fluctuations, and dispersion are proportional to total electron content (TEC) or its variation along the path. Tropospheric refraction and fading affects low angle satellite transmissions as well as terrestrial paths. Attenuation and depolarization due to rain become less important with decreasing frequency but need consideration for frequencies of about 4 GHz and higher. Empirically derived relations are useful for estimating the attenuation expected due to rain for particular percentages of time. Aeronautical, maritime, and land mobile satellite services are subject to fading due to multipath propagation. Author

**N84-20735\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYSIS OF RECTANGULAR MICROSTRIP ANTENNAS**

M. C. BAILEY and M. D. DESHPANDE (George Washington Univ.) Mar. 1984 61 p refs

(NASA-TP-2276; L-15698; NAS 1.60:2276) Avail: NTIS HC A04/MF A01 CSCL 17B

ANTENNA DESIGN, ANTENNA RADIATION PATTERNS, BANDWIDTH, MICROSTRIP TRANSMISSION LINES, RESONANT FREQUENCIES

## 33

### ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

**N77-30367\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**CONCEPT REPORT: MICROPROCESSOR CONTROL OF ELECTRICAL POWER SYSTEM**

E. PERRY Aug. 1977 22 p

(NASA-TP-1016; M-227) Avail: NTIS HC A02/MF A01 CSCL 09C

ELECTRIC POWER SUPPLIES, MICROPROCESSORS, REAL TIME OPERATION

**N78-11301\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INSTRUMENT TO AVERAGE 100 DATA SETS**

G. B. TUMA, A. G. BIRCHENOUGH, and W. J. RICE Oct. 1977 19 p

(NASA-TP-1055; E-9159) Avail: NTIS HC A02/MF A01 CSCL 09C

ANALOG DATA, CURVE FITTING, DATA CORRELATION



**N78-16266\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**PROCEEDINGS OF THE 1977 NASA/ISHM MICROELECTRONICS CONFERENCE**

S. V. CARUSO, comp. Nov. 1977 170 p refs Conf. held at Huntsville, Ala., 20-21 Sep. 1977

(NASA-CP-2027) Avail: NTIS HC A08/MF A01 CSDL 09C  
CONFERENCES, HYBRID CIRCUITS, MICROELECTRONICS, TECHNOLOGICAL FORECASTING

**N79-14309\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SPACE SHUTTLE ACTIVE-POGO-SUPPRESSOR CONTROL DESIGN USING LINEAR QUADRATIC REGULATOR TECHNIQUES**

B. LEHTINEN and C. F. LORENZ Jan. 1979 83 p refs  
(NASA-TP-1217; E-9578) Avail: NTIS HC A05/MF A01 CSDL 09C

POGO EFFECTS, SPACE SHUTTLES, STRUCTURAL VIBRATION, VIBRATION DAMPING

**N79-17139\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFICIENCY ENHANCEMENT OF OCTAVE-BANDWIDTH TRAVELING WAVE TUBES BY USE OF MULTISTAGE DEPRESSED COLLECTORS**

P. RAMINS and T. A. FOX Feb. 1979 29 p refs  
(NASA-TP-1416; E-9749) Avail: NTIS HC A03/MF A01 CSDL 09A

ACCUMULATORS, ELECTRON BEAMS, POLARIZATION (WAVES), TRAVELING WAVE TUBES

**N79-22375\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYTICAL PREDICTION WITH MULTIDIMENSIONAL COMPUTER PROGRAMS AND EXPERIMENTAL VERIFICATION OF THE PERFORMANCE, AT A VARIETY OF OPERATING CONDITIONS, OF TWO TRAVELING WAVE TUBES WITH DEPRESSED COLLECTORS**

J. A. DAYTON, JR., H. G. KOSMAHL, P. RAMINS, and N. STANKIEWICZ May 1979 28 p refs  
(NASA-TP-1449; E-9728) Avail: NTIS HC A03/MF A01 CSDL 09A

COMPUTER PROGRAMS, PERFORMANCE PREDICTION, TRAVELING WAVE TUBES

**N79-27400\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DESIGN OF HIGH-PERVEANCE CONFINED-FLOW GUNS FOR PERIODIC-PERMANENT-MAGNET-FOCUSED TUBES**

N. STANKIEWICZ Jun. 1979 17 p refs  
(NASA-TP-1485; E-9729) Avail: NTIS HC A02/MF A01 CSDL 09C

ELECTRON GUNS, FLOW CHARACTERISTICS, MAGNETIC FIELDS

**N79-28420\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFICIENCY ENHANCEMENT OF DUAL-MODE TRAVELING WAVE TUBES AT SATURATION AND IN THE LINEAR RANGE BY USE OF SPENT-BEAM REFOCUSING AND MULTISTAGE DEPRESSED COLLECTORS**

P. RAMINS and T. A. FOX Jul. 1979 26 p refs  
(NASA-TP-1486; E-9912) Avail: NTIS HC A03/MF A01 CSDL 09C

ACCUMULATORS, FOCUSING, TRAVELING WAVE TUBES

**N79-32467\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**OPTICALLY ISOLATED LOGARITHMIC NANOAMMETER CAPABLE OF FLOATING TO 5 KILOVOLTS**

J. C. STURMAN and J. C. DELAAT Washington Oct. 1979 22 p refs

(NASA-TP-1527; E-9934) Avail: NTIS HC A02/MF A01 CSDL 09C

HIGH VOLTAGES, MICROMILLIAMMETERS, OPTICAL MEASURING INSTRUMENTS

**N80-21669\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MULTISTAGE DEPRESSED COLLECTOR WITH EFFICIENCY OF 90 TO 94 PERCENT FOR OPERATION OF A DUAL-MODE TRAVELING WAVE TUBE IN THE LINEAR REGION**

P. RAMINS and T. A. FOX Washington Apr. 1980 16 p refs  
(NASA-TP-1670; E-9975) Avail: NTIS HC A02/MF A01 CSDL 09A

ELECTRON BEAMS, ELECTRON ENERGY, ENERGY CONVERSION EFFICIENCY, TRAVELING WAVE TUBES

**N80-33683\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPARATIVE PERFORMANCE OF HGCDTE PHOTODIODES FOR HETERODYNE APPLICATION**

H. R. KOWITZ Oct. 1980 15 p refs Presented at the Heterodyne Systems and Technol. Conf., Williamsburg, Va., 25-27 Mar. 1980

(NASA-TP-1745; L-14019) Avail: NTIS HC A02/MF A01 CSDL 09C

HETERODYNING, LASER SPECTROSCOPY, PHOTODIODES, QUANTUM EFFICIENCY

**N81-11315\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MODULAR INSTRUMENTATION SYSTEM FOR REAL-TIME MEASUREMENTS AND CONTROL ON RECIPROCATING ENGINES**

W. J. RICE and A. G. BIRCHENOUGH Nov. 1980 14 p refs  
(NASA-TP-1757; E-455) Avail: NTIS HC A02/MF A01 CSDL 14B

COMBUSTION EFFICIENCY, ENGINE ANALYZERS, ENGINE MONITORING INSTRUMENTS, PISTON ENGINES

**N81-20359\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THREE-AXIS ELECTRON-BEAM TEST FACILITY**

J. A. DAYTON, JR. and B. T. EBIHARA Mar. 1981 8 p  
(NASA-TP-1836; E-582) Avail: NTIS HC A02/MF A01 CSDL 09C

AUTOMATIC TEST EQUIPMENT, AXES OF ROTATION, CURRENT DENSITY, ELECTRON BEAMS, ELECTRONIC EQUIPMENT TESTS, MICROWAVE TUBES

**N81-22281\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A MICROPROCESSOR-BASED TABLE LOOKUP APPROACH FOR MAGNETIC BEARING LINEARIZATION**

N. J. GROOM and J. B. MILLER May 1981 29 p refs  
(NASA-TP-1838; L-13969) Avail: NTIS HC A03/MF A01 CSDL 13I

BEARINGS, ENERGY TRANSFER, LINEARIZATION, MAGNETIC SUSPENSION, MICROPROCESSORS, MOMENTUM TRANSFER

### 33 ELECTRONICS AND ELECTRICAL ENGINEERING

**N81-26372\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**CAPACITOR TECHNOLOGIES, APPLICATIONS AND RELIABILITY**

Jun. 1981 158 p refs Proceedings of a Symp. held at Marshall Space Flight Center, Ala., 24-25 Feb. 1981 (NASA-CP-2186; M-351) Avail: NTIS HC A08/MF A01 CSCL 09A

ACCELERATED LIFE TESTS, CAPACITORS, CONFERENCES, ELECTRICAL PROPERTIES

**N81-28352\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYTICAL PREDICTION AND EXPERIMENTAL VERIFICATION OF PERFORMANCE AT VARIOUS OPERATING CONDITIONS OF A DUAL-MODE TRAVELING WAVE TUBE WITH MULTISTAGE DEPRESSED COLLECTORS**

J. A. DAYTON, JR., H. G. KOSMAHL, P. RAMINS, and N. STANKIEWICZ Jul. 1981 27 p refs (NASA-TP-1831; E-577) Avail: NTIS HC A03/MF A01 CSCL 09C

ELECTRON BEAMS, RADIO FREQUENCY DISCHARGE, TRAVELING WAVE TUBES

**N81-30360\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF COMPUTER-DESIGNED SMALL-SIZED FOUR-STAGE DEPRESSED COLLECTOR FOR OPERATION OF DUAL-MODE TRAVELING WAVE TUBE**

P. RAMINS and T. A. FOX Aug. 1981 14 p refs (NASA-TP-1832; E-643) Avail: NTIS HC A02/MF A01 CSCL 09C

ACCUMULATORS, COMPUTER AIDED DESIGN, CURRENT DISTRIBUTION, TRAVELING WAVE TUBES

**N82-20402\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE 1981 GODDARD SPACE FLIGHT CENTER BATTERY WORKSHOP**

G. HALPERT, ed. Mar. 1982 544 p Workshop held in Greenbelt, Md., 17-19 Nov. 1981 (NASA-CP-2217; NAS 1.55:2217) Avail: NTIS HC A23/MF A01 CSCL 10C

CONFERENCES, ELECTRIC BATTERIES, ELECTROLYTES, LITHIUM SULFUR BATTERIES, NICKEL CADMIUM BATTERIES, NICKEL HYDROGEN BATTERIES, SPACECRAFT POWER SUPPLIES

**N82-22439\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THREE-DIMENSIONAL RELATIVISTIC FIELD-ELECTRON INTERACTION IN A MULTICAVITY HIGH-POWER KLYSTRON. 1: BASIC THEORY**

H. G. KOSMAHL Apr. 1982 33 p refs Presented at the Intern. Electron Devices Meeting, Washington, D.C., 11 Oct. 1971; sponsored by IEEE; and the Solar Power Space System Workshop, Houston, Tex., 15-18 Jan. 1979; sponsored by NASA (NASA-TP-1992; E-1017; NAS 1.60:1992) Avail: NTIS HC A03/MF A01 CSCL 09A

CAVITY RESONATORS, ELECTROMAGNETIC FIELDS, ELECTRON TRAJECTORIES, KLYSTRONS, MAGNETIC FIELDS, PARTICLE MOTION, RELATIVISTIC PARTICLES

**N82-23397\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THREE-DIMENSIONAL RELATIVISTIC FIELD-ELECTRON INTERACTION IN A MULTICAVITY HIGH-POWER KLYSTRON. PART 2: WORKING EQUATIONS**

H. G. KOSMAHL Apr. 1982 45 p refs Presented at the Intern. Electron Devices Meeting, Washington, D.C., 11 Oct. 1971; sponsored by IEEE. Also presented at the Solar Power Space System Workshop, Houston, Tex., 15-18 Jan. 1979; sponsored by NASA. Lyndon B. Johnson Space Center (NASA-TP-2008; E-1018; NAS 1.60:2008) Avail: NTIS HC A03/MF A01 CSCL 09C

ELECTRON BUNCHING, ELECTRON SCATTERING, KLYSTRONS, MAGNETIC AMPLIFIERS, RADIO FREQUENCY DISCHARGE, RELATIVISTIC ELECTRON BEAMS

**N82-25441\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPUTER MODELING OF MULTIPLE-CHANNEL INPUT SIGNALS AND INTERMODULATION LOSSES CAUSED BY NONLINEAR TRAVELING WAVE TUBE AMPLIFIERS**

N. STANKIEWICZ May 1982 26 p (NASA-TP-1999; E-722; NAS 1.60:1999) Avail: NTIS HC A03/MF A01 CSCL 09A

INTERMODULATION, MATHEMATICAL MODELS, SIGNAL DISTORTION, TRAVELING WAVE TUBES

**N83-25985\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL VERIFICATION OF THE MULTISTAGE DEPRESSED COLLECTOR DESIGN PROCEDURE FOR A HIGH-PERVEANCE, HELIX-TYPE, TRAVELING-WAVE TUBE**

J. A. DAYTON, JR., H. G. KOSMAHL, and P. RAMINS May 1983 24 p refs (NASA-TP-2162; E-1362; NAS 1.60:2162) Avail: NTIS HC A02/MF A01 CSCL 09A

ACCUMULATORS, COMMUNICATION SATELLITES, ELECTRONIC COUNTERMEASURES, FOCUSING, PERVEANCE, TRAVELING WAVE TUBES

**N83-35230\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE 1982 GODDARD SPACE FLIGHT CENTER BATTERY WORKSHOP**

G. HALPERT, ed. Aug. 1983 540 p refs The 15th Ann. Workshop held in Greenbelt, Md., 16-18 Nov. 1982 (NASA-CP-2263; REPT-83F5181; NAS 1.55:2263) Avail: NTIS HC A23/MF A01 CSCL 10C

LITHIUM SULFUR BATTERIES, NICKEL HYDROGEN BATTERIES, SAFETY, SPACECRAFT POWER SUPPLIES, STORAGE BATTERIES

**N84-15394\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF COMPUTER-DESIGNED SMALL-SIZE MULTISTAGE DEPRESSED COLLECTORS FOR A HIGH-PERVEANCE TRAVELING WAVE TUBE**

P. RAMINS Jan. 1984 24 p refs (NASA-TP-2248; E-1700; NAS 1.60:2248) Avail: NTIS HC A02/MF A01 CSCL 09A

ACCUMULATORS, ELECTRODES, TRAVELING WAVE TUBES

**N84-16461\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DEVELOPMENT OF AN INSTRUMENT FOR REAL-TIME COMPUTATION OF INDICATED MEAN EFFECTIVE PRESSURE**

W. J. RICE Jan. 1984 22 p refs (NASA-TP-2238; E-1650; NAS 1.60:2238) Avail: NTIS HC A02/MF A01 CSCL 14B

ELECTRONIC EQUIPMENT, ENGINE MONITORING INSTRUMENTS, INTERNAL COMBUSTION ENGINES, REAL TIME OPERATION

**N84-20758\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**TOPICS IN THE OPTIMIZATION OF MILLIMETER-WAVE MIXERS**

P. H. SIEGEL, A. R. KERR, and W. HWANG Mar. 1984 523 p refs

(NASA-TP-2287; NAS 1.60:2287) Avail: NTIS HC A22/MF A01 CSCL 09C

COMPUTER PROGRAMS, MILLIMETER WAVES, MIXERS, MULTIPLIERS, SCHOTTKY DIODES, VARACTOR DIODES

**N84-20759\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PERFORMANCE OF ALKALINE BATTERY CELLS USED IN EMERGENCY LOCATOR TRANSMITTERS**

G. A. HAYNES, S. SOKOL, W. R. MOTLEY, III, and E. L. MCCLELLAND Mar. 1984 60 p refs

(NASA-TP-2277; L-15496; NAS 1.60:2277) Avail: NTIS HC A04/MF A01 CSCL 09C

ALKALINE BATTERIES, EMERGENCY LOCATOR TRANSMITTERS, MANGANESE COMPOUNDS, ZINC COMPOUNDS

**N84-33668\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE 1983 GODDARD SPACE FLIGHT CENTER BATTERY WORKSHOP**

D. BAER, ed. and G. W. MORROW, ed. Washington Sep. 1984 548 p refs Workshop held in Greenbelt, Md., 15-17 Nov. 1983

(NASA-CP-2331; NAS 1.55:2331) Avail: NTIS HC A23/MF A01 CSCL 10C

ENERGY STORAGE, LIFE (DURABILITY), LITHIUM SULFUR BATTERIES, SPACECRAFT POWER SUPPLIES

**N85-13156\*#** National Aeronautics and Space Administration. Washington, D.C.

**PROCEDURES FOR PRECAP VISUAL INSPECTION**

1984 81 p refs

(NASA-RP-1122; NAS 1.61:1122) Avail: NTIS HC A05/MF A01 CSCL 09C

Screening procedures for the final precap visual inspection of microcircuits used in electronic system components are described as an aid in training personnel unfamiliar with microcircuits. Processing techniques used in industry for the manufacture of monolithic and hybrid components are presented and imperfections that may be encountered during this inspection are discussed. Problem areas such as scratches, voids, adhesions, and wire bonding are illustrated by photomicrographs. This guide can serve as an effective tool in training personnel to perform precap visual inspections efficiently and reliably. Author

**N85-31371\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE 1984 GODDARD SPACE FLIGHT CENTER BATTERY WORKSHOP**

G. W. MORROW, ed. Washington Jul. 1985 592 p refs Workshop held in Greenbelt, Md., 13-15 Nov. 1984

(NASA ORDER S-14764-D)

(NASA-CP-2382; REPT-85B0328; NAS 1.55:2382) Avail: NTIS HC A25/MF A01 CSCL 10C

CONFERENCES, NICKEL CADMIUM BATTERIES, NICKEL HYDROGEN BATTERIES, SPACE STATIONS, SPACECRAFT POWER SUPPLIES

**N86-13643\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**VERIFICATION OF COMPUTER-AIDED DESIGNS OF TRAVELING-WAVE TUBES UTILIZING NOVEL DYNAMIC REFOCUSERS AND GRAPHITE ELECTRODES FOR THE MULTISTAGE DEPRESSED COLLECTOR**

P. RAMINS, H. G. KOSMAHL, D. A. FORCE, R. W. PALMER, and J. A. DAYTON, JR. Oct. 1985 26 p refs

(NASA-TP-2524; E-2566; NAS 1.60:2524) Avail: NTIS HC A03/MF A01 CSCL 09A

COMPUTER AIDED DESIGN, ELECTRIC POTENTIAL, ELECTRODES, ELECTRON EMISSION, GRAPHITE, TRAVELING WAVE TUBES

**N86-14498\*#** National Aeronautics and Space Administration. Washington, D.C.

**HIGH-DENSITY DIGITAL RECORDING**

F. KALIL, ed. and A. BUSCHMAN, ed. (Naval Intelligence Support Center, Suitland, Md.) Sep. 1985 319 p refs

(NASA-RP-1111; NAS 1.61:1111) Avail: NTIS HC A14/MF A01 CSCL 01C

The problems associated with high-density digital recording (HDDR) are discussed. Five independent users of HDDR systems and their problems, solutions, and insights are provided as guidance for other users of HDDR systems. Various pulse code modulation coding techniques are reviewed. An introduction to error detection and correction head optimization theory and perpendicular recording are provided. Competitive tape recorder manufacturers apply all of the above theories and techniques and present their offerings. The methodology used by the HDDR Users Subcommittee of THIC to evaluate parallel HDDR systems is presented. E.A.K.

**N86-20678\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DEVELOPMENT OF UHF RADIOMETER**

B. M. KENDALL, H. J. C. BLUME, and A. E. CROSS Dec. 1985 58 p refs

(NASA-TP-2504; L-16006; NAS 1.60:2504) Avail: NTIS HC A04/MF A01 CSCL 09A

MICROWAVE RADIOMETERS, OCEANS, REMOTE SENSING, SALINITY, ULTRAHIGH FREQUENCIES

**N86-21755\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PROGRAMMABLE, AUTOMATED TRANSISTOR TEST SYSTEM**

L. V. TRUONG and G. R. SUNDBURG 1986 25 p refs Presented at the 3rd Symposium on Space Nuclear Power Systems, Albuquerque, N. Mex., 13-16 Jan. 1986

(NASA-TP-2554; E-2768; NAS 1.60:2554) Avail: NTIS HC A02/MF A01 CSCL 09A

BIPOLAR TRANSISTORS, FIELD EFFECT TRANSISTORS, PERFORMANCE TESTS, SOFTWARE ENGINEERING

**N86-32629\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SECONDARY-ELECTRON-EMISSION LOSSES IN MULTISTAGE DEPRESSED COLLECTORS AND TRAVELING-WAVE-TUBE EFFICIENCY IMPROVEMENTS WITH CARBON COLLECTOR ELECTRODE SURFACES**

P. RAMINS and B. T. EBIHARA Sep. 1986 23 p

(NASA-TP-2622; E-3062; NAS 1.60:2622) Avail: NTIS HC A02/MF A01 CSCL 09C

ACCUMULATORS, ELECTRODES, ELECTRON EMISSION, GRAPHITE, SECONDARY EMISSION, TRAVELING WAVE TUBES

## FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

**N77-30413\*** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LIQUID JET IMPINGEMENT NORMAL TO A DISK IN ZERO GRAVITY** Ph.D. Thesis Toledo Univ.

T. L. LABUS Aug. 1977 118 p refs  
(NASA-TP-1017; E-8668) Avail: NTIS HC A06/MF A01 CSCL 20D

DISKS (SHAPES), FLUID JETS, FREE JETS, JET IMPINGEMENT, WEIGHTLESSNESS

**N77-31441\*** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**REPRESENTATION OF TURBULENT SHEAR STRESS BY A PRODUCT OF MEAN VELOCITY DIFFERENCES**

W. H. BRAUN Sep. 1977 50 p refs  
(NASA-TP-1029; E-9057) Avail: NTIS HC A03/MF A01 CSCL 20D

FLOW VELOCITY, SHEAR STRESS, TURBULENT BOUNDARY LAYER, TURBULENT FLOW

**N77-32431\*** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MEAN VELOCITY, TURBULENCE INTENSITY, AND SCALE IN A SUBSONIC TURBULENT JET IMPINGING NORMAL TO A LARGE FLAT PLATE**

D. R. BOLDMAN and P. F. BRINICH Sep. 1977 35 p refs  
(NASA-TP-1037; E-8998) Avail: NTIS HC A03/MF A01 CSCL 20D

AERODYNAMIC NOISE, JET IMPINGEMENT, NOZZLE FLOW, TURBULENT FLOW

**N77-32432\*** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF FIN PASSAGE LENGTH ON OPTIMIZATION OF CYLINDER HEAD COOLING FINS**

R. SIEGEL and R. W. GRAHAM Sep. 1977 34 p refs  
(NASA-TP-1054; E-9098) Avail: NTIS HC A03/MF A01 CSCL 21A

AIRCRAFT ENGINES, COOLING FINS, ENGINE DESIGN

**N77-33444\*** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**VAPOR INGESTION IN CENTAUR LIQUID-HYDROGEN TANK**

E. P. SYMONS Oct. 1977 31 p refs  
(NASA-TP-1061; E-9234) Avail: NTIS HC A03/MF A01 CSCL 20D

CENTAUR PROJECT, CRYOGENIC ROCKET PROPELLANTS, LIQUID HYDROGEN, TANKS (CONTAINERS), VAPOR JETS

**N78-13371\*** # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CALCULATION METHODS FOR COMPRESSIBLE TURBULENT BOUNDARY LAYERS, 1976**

D. M. BUSHNELL, A. M. CARY, JR., and J. E. HARRIS 1977 146 p refs Presented at the 1976 Von Karman Inst. for Fluid Dyn. Lecture Ser. Compressible Turbulent Boundary Layers, Rhode-St.-Genese, Belgium, 1-5 Mar. 1976  
(NASA-SP-422) Avail: NTIS HC A07/MF A01 CSCL 20D

Equations and closure methods for compressible turbulent boundary layers are discussed. Flow phenomena peculiar to calculation of these boundary layers were considered, along with calculations of three dimensional compressible turbulent boundary layers. Procedures for ascertaining nonsimilar two and three dimensional compressible turbulent boundary layers were appended, including finite difference, finite element, and

mass-weighted residual methods. For individual titles, see N78-13372 through N78-13375.

**N78-13379\*** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF FILM INJECTION ANGLE ON TURBINE VANE COOLING**

J. W. GAUNTNER Dec. 1977 24 p refs  
(NASA-TP-1095; E-9254) Avail: NTIS HC A02/MF A01 CSCL 20D

FILM COOLING, HEAT TRANSFER, TURBINE BLADES

**N78-15434\*** # National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**A DESIGN HANDBOOK FOR PHASE CHANGE THERMAL CONTROL AND ENERGY STORAGE DEVICES**

W. R. HUMPHRIES and E. I. GRIGGS Nov. 1977 255 p refs  
(NASA-TP-1074; M-230) Avail: NTIS HC A12/MF A01 CSCL 20D

ENERGY STORAGE, PARAFFINS, PHASE TRANSFORMATIONS, TEMPERATURE PROBES

**N78-16326\*** # National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**EFFECTS OF MASS ADDITION ON BLUNT-BODY BOUNDARY-LAYER TRANSITION AND HEAT TRANSFER**

G. E. KAATTARI Jan. 1978 67 p refs  
(NASA-TP-1139; A-7169) Avail: NTIS HC A04/MF A01 CSCL 20D

BLUNT BODIES, BOUNDARY LAYER TRANSITION, LAMINAR HEAT TRANSFER, MASS TRANSFER

**N78-17338\*** # National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**METHOD FOR CALCULATING CONVECTIVE HEAT-TRANSFER COEFFICIENTS OVER TURBINE VANE SURFACES**

D. J. GAUNTNER and J. SUCEC Jan. 1978 18 p refs  
(NASA-TP-1134; E-9324) Avail: NTIS HC A02/MF A01 CSCL 20D

CONVECTIVE HEAT TRANSFER, HEAT TRANSFER COEFFICIENTS, SURFACE TEMPERATURE, TURBINE BLADES, VANES

**N78-18362\*** # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FOREBODY AND AFTERBODY SOLUTIONS OF THE NAVIER-STOKES EQUATIONS FOR SUPERSONIC FLOW OVER BLUNT BODIES IN A GENERALIZED ORTHOGONAL COORDINATE SYSTEM**

P. A. GNOFFO Feb. 1978 89 p refs  
(NASA-TP-1075; L-11770) Avail: NTIS HC A05/MF A01 CSCL 20D

BLUNT BODIES, COORDINATE TRANSFORMATIONS, NAVIER-STOKES EQUATION, SUPERSONIC FLOW

**N78-18363\*** # National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVISCID, NONADIABATIC FLOW FIELDS OVER BLUNT, SONIC CORNER BODIES FOR OUTER PLANET ENTRY CONDITIONS BY A METHOD OF INTEGRAL RELATIONS**

P. A. GNOFFO Feb. 1978 52 p refs  
(NASA-TP-1133; L-11944) Avail: NTIS HC A04/MF A01 CSCL 20D

ANGLE OF ATTACK, BLUNT BODIES, FLOW DISTRIBUTION, INVISCID FLOW

**N78-18364\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

## EFFECTIVE THERMAL CONDUCTIVITY DETERMINATION FOR LOW-DENSITY INSULATING MATERIALS

S. D. WILLIAMS (Lockheed Electronics Co., Houston, Tex.) and D. M. CURRY Feb. 1978 25 p refs  
(NASA-TP-1155; S-481) Avail: NTIS HC A02/MF A01 CSCL 20D

INSULATION, LOW DENSITY MATERIALS, THERMAL CONDUCTIVITY

**N78-20463\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## APPLICATION OF A TWO-DIMENSIONAL PARABOLIC COMPUTER PROGRAM TO PREDICTION OF TURBULENT REACTING FLOWS

J. S. EVANS, C. J. SCHEXNAYDER, JR., and H. L. BEACH, JR. Mar. 1978 59 p refs  
(NASA-TP-1169) Avail: NTIS HC A04/MF A01 CSCL 20D

COMPUTER PROGRAMS, KINETIC ENERGY, PARABOLIC DIFFERENTIAL EQUATIONS, TURBULENT FLOW, TWO DIMENSIONAL FLOW

**N78-21410\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## CORRELATION OF LASER VELOCIMETER MEASUREMENTS OVER A WING WITH RESULTS OF TWO PREDICTION TECHNIQUES

D. R. HOAD, J. F. MEYERS, W. H. YOUNG, JR., and T. P. HEPNER Apr. 1978 66 p refs  
(DA PROJ.1L1-61102-AH-45)

(NASA-TP-1168; L-11980) Avail: NTIS HC A04/MF A01 CSCL 20D

DATA CORRELATION, LASER DOPPLER VELOCIMETERS, PREDICTION ANALYSIS TECHNIQUES, UNSWEPT WINGS, WIND TUNNEL TESTS

**N78-22331\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## WAKE-SHOCK INTERACTION AT A MACH NUMBER OF 6

M. J. WALSH Mar. 1978 192 p refs  
(NASA-TP-1103; L-11904) Avail: NTIS HC A09/MF A01 CSCL 20D

MACH NUMBER, SHOCK WAVE INTERACTION, WAKES

**N78-22332\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## SOLUTION OF AXISYMMETRIC AND TWO-DIMENSIONAL INVISCID FLOW OVER BLUNT BODIES BY THE METHOD OF LINES

H. H. HAMILTON, II Apr. 1978 59 p refs  
(NASA-TP-1154; L-11983) Avail: NTIS HC A04/MF A01 CSCL 20D

AXISYMMETRIC FLOW, BLUNT BODIES, INVISCID FLOW, TWO DIMENSIONAL FLOW

**N78-22333\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## COMPARISON OF TWO COMPUTER PROGRAMS BY PREDICTING TURBULENT MIXING OF HELIUM IN A DUCTED SUPERSONIC AIRSTREAM

Y. S. PAN, J. P. DRUMMOND, and C. R. MCCLINTON May 1978 69 p refs  
(NASA-TP-1166; L-11949) Avail: NTIS HC A04/MF A01 CSCL 20D

COMPUTER PROGRAMS, DUCTED FLOW, HELIUM, SUPERSONIC FLOW, TURBULENT MIXING

**N78-23389\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## CONFIGURATION HEATING FOR A HYPERSONIC RESEARCH AIRPLANE CONCEPT HAVING A 70 DEG SWEEP DOUBLE-DELTA WING

P. L. LAWING May 1978 74 p refs  
(NASA-TP-1143; L-11841) Avail: NTIS HC A04/MF A01 CSCL 20D

AIRCRAFT CONFIGURATIONS, DELTA WINGS, HEAT TRANSFER COEFFICIENTS, HYPERSONIC VEHICLES

**N78-23390\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

## A NUMERICAL SOLUTION OF THE NAVIER-STOKES EQUATIONS FOR CHEMICALLY NONEQUILIBRIUM, MERGED STAGNATION SHOCK LAYERS ON SPHERES AND TWO-DIMENSIONAL CYLINDERS IN AIR

K. D. JOHNSTON and W. L. HENDRICKS (Lockheed Missiles and Space Co., Huntsville, Ala.) May 1978 102 p refs  
(NASA-TP-1227; M-254) Avail: NTIS HC A06/MF A01 CSCL 20D

NAVIER-STOKES EQUATION, NONEQUILIBRIUM CONDITIONS, SHOCK LAYERS

**N78-26392\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## INDUCED VELOCITY FIELD OF A JET IN A CROSSFLOW

R. L. FEARN (Florida Univ., Gainesville) and R. P. WESTON May 1978 148 p refs  
(NASA-TP-1087; L-11624) Avail: NTIS HC A07/MF A01 CSCL 20D

CROSS FLOW, JET EXHAUST, SUBSONIC FLOW, VELOCITY DISTRIBUTION

**N78-28373\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## AERODYNAMIC HEATING IN GAPS OF THERMAL PROTECTION SYSTEM TILE ARRAYS IN LAMINAR AND TURBULENT BOUNDARY LAYERS

D. E. AVERY Jul. 1978 49 p refs  
(NASA-TP-1187; L-12009) Avail: NTIS HC A03/MF A01 CSCL 20D

AERODYNAMIC HEAT TRANSFER, GAPS, HEAT SHIELDING, TILES

**N78-28374\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## TACT1, A COMPUTER PROGRAM FOR THE TRANSIENT THERMAL ANALYSIS OF A COOLED TURBINE BLADE OR VANE EQUIPPED WITH A COOLANT INSERT. 1. USERS MANUAL

R. E. GAUGLER Aug. 1978 78 p refs  
(NASA-TP-1271; E-9554) Avail: NTIS HC A05/MF A01 CSCL 21E

COMPUTER PROGRAMS, FLOW MEASUREMENT, PRESSURE MEASUREMENT, TEMPERATURE MEASUREMENT

**N78-30554\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## TURBULENT-FLOW SEPARATION CRITERIA FOR OVEREXPANDED SUPERSONIC NOZZLES

E. L. MORRISETTE and T. J. GOLDBERG Aug. 1978 39 p refs  
(NASA-TP-1207; L-11530) Avail: NTIS HC A03/MF A01 CSCL 20D

SEPARATED FLOW, SUPERSONIC FLOW, SUPERSONIC NOZZLES, TURBULENT FLOW

### 34 FLUID MECHANICS AND HEAT TRANSFER

**N78-30555\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.  
**REINFORCED CARBON-CARBON OXIDATION BEHAVIOR IN CONVECTIVE AND RADIATIVE ENVIRONMENTS**  
D. M. CURRY, K. J. JOHANSEN (Vought Corp., Dallas), and E. W. STEPHENS Aug. 1978 31 p refs  
(NASA-TP-1284; S-485) Avail: NTIS HC A03/MF A01 CSDL 20D  
CARBON-CARBON COMPOSITES, PLASMA JETS, RADIANT HEATING, THERMAL PROTECTION

**N78-31384\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**DRAINING CHARACTERISTICS OF HEMISPHERICALLY BOTTOMED CYLINDERS IN A LOW-GRAVITY ENVIRONMENT**  
E. P. SYMONS Aug. 1978 31 p refs  
(NASA-TP-1297; E-9582) Avail: NTIS HC A03/MF A01 CSDL 20D  
DRAINAGE, FLUID MECHANICS, GRAVITATIONAL EFFECTS, WEIGHTLESSNESS

**N78-32385\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**INVERSE BOUNDARY-LAYER THEORY AND COMPARISON WITH EXPERIMENT**  
J. E. CARTER Sep. 1978 55 p refs  
(NASA-TP-1208; L-12190) Avail: NTIS HC A04/MF A01 CSDL 20D  
BOUNDARY LAYER FLOW, FINITE DIFFERENCE THEORY, REATTACHED FLOW, SEPARATED FLOW

**N78-33385\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**DIRECT MEASUREMENTS AND ANALYSIS OF SKIN FRICTION AND COOLING DOWNSTREAM OF MULTIPLE FLUSH-SLOT INJECTION INTO A TURBULENT MACH 6 BOUNDARY LAYER**  
F. G. HOWARD and A. J. STROKOWSKI Oct. 1978 112 p refs  
(NASA-TP-1176; L-11950) Avail: NTIS HC A06/MF A01 CSDL 20D  
FILM COOLING, FLUID INJECTION, FRICTION MEASUREMENT, SKIN FRICTION, TURBULENT BOUNDARY LAYER

**N79-10379\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**A SIPHON METHOD OF DETERMINING RESISTIVITIES OF THIN HEAT-PIPE WICKS**  
S. KATZOFF Oct. 1978 16 p refs  
(NASA-TP-1304; L-12266) Avail: NTIS HC A02/MF A01 CSDL 20D  
FLOW RESISTANCE, HEAT PIPES, SIPHONS, WICKS

**N79-13305\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**CRITICAL STUDY OF HIGHER ORDER NUMERICAL METHODS FOR SOLVING THE BOUNDARY-LAYER EQUATIONS**  
S. F. WORNOM Nov. 1978 55 p refs  
(NASA-TP-1302; L-11860) Avail: NTIS HC A04/MF A01 CSDL 20D  
BOUNDARY LAYER EQUATIONS, FINITE ELEMENT METHOD, PARABOLIC DIFFERENTIAL EQUATIONS

**N79-14327\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EXPERIMENTAL PERFECT-GAS STUDY OF EXPANSION-TUBE FLOW CHARACTERISTICS**  
J. L. SHINN and C. G. MILLER, III Dec. 1978 88 p refs  
(NASA-TP-1317; L-12407) Avail: NTIS HC A05/MF A01 CSDL 20D  
EXPANSION, FLOW CHARACTERISTICS, HELIUM, TUBES

**N79-14328\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**CHARACTERISTICS OF MACH 10 TRANSITIONAL AND TURBULENT BOUNDARY LAYERS**  
R. D. WATSON Nov. 1978 324 p  
(NASA-TP-1243; L-12016) Avail: NTIS HC A14/MF A01 CSDL 20D  
BOUNDARY LAYER TRANSITION, FLOW CHARACTERISTICS, MACH NUMBER, TURBULENT BOUNDARY LAYER

**N79-18287\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**TRANSIENT SHUTDOWN ANALYSIS OF LOW-TEMPERATURE THERMAL DIODES**  
R. J. WILLIAMS Mar. 1979 21 p refs  
(NASA-TP-1369; A-7642) Avail: NTIS HC A02/MF A01 CSDL 20D  
CRYOGENIC EQUIPMENT, DIODES, HEAT PIPES, TEMPERATURE CONTROL

**N79-18288\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**TACT 1: A COMPUTER PROGRAM FOR THE TRANSIENT THERMAL ANALYSIS OF A COOLED TURBINE BLADE OR VANE EQUIPPED WITH A COOLANT INSERT. 2. PROGRAMMERS MANUAL**  
R. E. GAUGLER Jan. 1979 164 p refs  
(NASA-TP-1391; E-9767) Avail: NTIS HC A08/MF A01 CSDL 20D  
AXIAL FLOW TURBINES, COMPUTER PROGRAMS, COOLING, IMPINGEMENT, TURBINE BLADES

**N79-20344\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**PRESSURE AND THERMAL DISTRIBUTIONS ON WINGS AND ADJACENT SURFACES INDUCED BY ELEVON DEFLECTIONS AT MACH 6**  
L. G. KAUFMAN, II (Grumman Aerospace Corp., Bethpage, N. Y.) and C. B. JOHNSON Mar. 1979 59 p refs  
(NASA-TP-1356; L-12636) Avail: NTIS HC A04/MF A01 CSDL 01A  
DEFLECTION, ELEVONS, HEAT TRANSFER, PRESSURE DISTRIBUTION, TEMPERATURE DISTRIBUTION, WINGS

**N79-20345\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**MEASURED AND PREDICTED SHOCK SHAPES AND AERODYNAMIC COEFFICIENTS FOR BLUNTED CONES AT INCIDENCE IN HELIUM AT MACH 20.3**  
R. L. CALLOWAY and N. H. WHITE Mar. 1979 74 p refs  
(NASA-TP-1395; L-12058) Avail: NTIS HC A04/MF A01 CSDL 01A  
AERODYNAMIC COEFFICIENTS, BLUNT BODIES, HELIUM, ROCKET NOSE CONES, SHOCK RESISTANCE

**N79-22427\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**REVIEW AND STATUS OF LIQUID-COOLING TECHNOLOGY FOR GAS TURBINES**  
G. J. VANFOSSEN, JR. and F. S. STEPKA Washington Apr. 1979 31 p refs  
(NASA-RP-1038; E-9517; AVRADCOM-TR-78-21) Avail: NTIS HC A03/MF A01 CSDL 20D  
A review was conducted of liquid-cooled turbine technology. Selected liquid-cooled systems and methods are presented along with an assessment of the current technology status and requirements. A comprehensive bibliography is presented.

Author

**N79-29467\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## CONTOURED TANK OUTLETS FOR DRAINING OF CYLINDRICAL TANKS IN LOW-GRAVITY ENVIRONMENT

E. P. SYMONS Jul. 1979 45 p  
(NASA-TP-1492; E-9969) Avail: NTIS HC A03/MF A01 CSCL 20D

CYLINDRICAL TANKS, DRAINAGE, OUTLET FLOW, PROPELLANT TANKS, TANK GEOMETRY, WEIGHTLESSNESS

**N79-29468\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## TWO-PHASE CHOKED FLOW OF CRYOGENIC FLUIDS IN CONVERGING-DIVERGING NOZZLES

R. J. SIMONEAU and R. C. HENDRICKS Jul. 1979 83 p refs  
(NASA-TP-1484; E-9659) Avail: NTIS HC A05/MF A01 CSCL 20D

CHOKES (RESTRICTIONS), CONVERGENT-DIVERGENT NOZZLES, CRYOGENIC FLUIDS, TWO PHASE FLOW

**N79-30516\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## DESCRIPTION AND ORBIT DATA OF VARIABLE-CONDUCTANCE HEAT-PIPE SYSTEM FOR THE COMMUNICATIONS TECHNOLOGY SATELLITE

L. GEDEON Aug. 1979 23 p refs  
(NASA-TP-1465; E-9880) Avail: NTIS HC A02/MF A01 CSCL 20D

COMMUNICATIONS TECHNOLOGY SATELLITE, HEAT PIPES, TEMPERATURE CONTROL

**N79-30518\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## THE USE OF COMPUTER-GENERATED COLOR GRAPHIC IMAGES FOR TRANSIENT THERMAL ANALYSIS

C. L. W. EDWARDS, F. T. MEISSNER, and J. B. HALL Jul. 1979 47 p  
(NASA-TP-1455; L-12779) Avail: NTIS HC A03/MF A01 CSCL 20D

AERODYNAMIC HEATING, COMPUTER GRAPHICS, HYPERSONIC AIRCRAFT, IMAGING TECHNIQUES

**N79-32500\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## VELOCITY FIELD OF A ROUND JET IN A CROSS FLOW FOR VARIOUS JET INJECTION ANGLES AND VELOCITY RATIOS

R. L. FEARN (Florida Univ., Gainesville) and R. P. WESTON Oct. 1979 134 p refs  
(NASA-TP-1506; L-12775) Avail: NTIS HC A07/MF A01 CSCL 20D

AIR JETS, CROSS FLOW, GAS INJECTION, VELOCITY DISTRIBUTION, WIND TUNNEL TESTS

**N79-33438\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## SURVEY AND BIBLIOGRAPHY ON ATTAINMENT OF LAMINAR FLOW CONTROL IN AIR USING PRESSURE GRADIENT AND SUCTION, VOLUME 1

D. M. BUSHNELL and M. H. TUTTLE Sep. 1979 346 p  
(NASA-RP-1035; L-12528) Avail: NTIS HC A15/MF A01 CSCL 20D

A survey was conducted and a bibliography compiled on attainment of laminar flow in air through the use of favorable pressure gradient and suction. This report contains the survey, summaries of data for both ground and flight experiments, and abstracts of referenced reports. Much early information is also included which may be of some immediate use as background material for LFC applications. G.Y.

**N79-33441\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## A HYBRIDIZED METHOD FOR COMPUTING HIGH-REYNOLDS-NUMBER HYPERSONIC FLOW ABOUT BLUNT BODIES

K. J. WEILMUNSTER and H. H. HAMILTON, II Washington Oct. 1979 49 p refs  
(NASA-TP-1497; L-12946) Avail: NTIS HC A03/MF A01 CSCL 01A

BLUNT BODIES, FINITE DIFFERENCE THEORY, HYPERSONIC FLOW, REYNOLDS NUMBER, VISCOUS FLOW

**N80-13402\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## AEROTHERMAL PERFORMANCE OF RADIATIVELY AND ACTIVELY COOLED PANEL AT MACH 6.6

C. P. SHORE and I. WEINSTEIN Dec. 1979 42 p refs  
(NASA-TP-1595; L-13355) Avail: NTIS HC A03/MF A01 CSCL 20D

AERODYNAMIC HEATING, AEROTHERMODYNAMICS, AIRFRAMES, COOLING SYSTEMS, HYPERSONIC AIRCRAFT

**N80-15361\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## COMPUTER PROGRAM FOR GENERATING INPUT FOR ANALYSIS OF IMPINGEMENT-COOLED, AXIAL-FLOW TURBINE BLADE

D. ROSENBAUM Jan. 1980 57 p refs Prepared in cooperation with Army Aviation Research and Development Command, Cleveland, Ohio  
(NASA-TP-1603; AVRADCOM-TR-79-34) Avail: NTIS HC A04/MF A01 CSCL 20D

AIR COOLING, AXIAL FLOW TURBINES, COMPUTER PROGRAMS, JET IMPINGEMENT, TURBINE BLADES

**N80-17397\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## EFFECTS OF A CERAMIC COATING ON METAL TEMPERATURES OF AN AIR-COOLED TURBINE VANE

H. J. GLADDEN and C. H. LIEBERT Feb. 1980 29 p refs  
(NASA-TP-1598; E-167) Avail: NTIS HC A03/MF A01 CSCL 20D

AIR COOLING, CERAMICS, SURFACE TEMPERATURE, THERMAL CONTROL COATINGS, TURBINE BLADES

**N80-17398\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## VOLUME-ENERGY PARAMETERS AND TURBULENT-FLOW DENSITY FLUCTUATIONS

R. C. HENDRICKS Jan. 1980 28 p refs  
(NASA-TP-1585; E-127) Avail: NTIS HC A03/MF A01 CSCL 20D

DENSITY DISTRIBUTION, GIBBS FREE ENERGY, TURBULENT FLOW, VOLUME

**N80-20527\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

## PROGRESS IN TURBULENCE MODELING FOR COMPLEX FLOW FIELDS INCLUDING EFFECTS OF COMPRESSIBILITY

D. C. WILCOX (DCW Industries, Inc., Studio City, Calif.) and M. W. RUBESIN Washington Apr. 1980 73 p refs  
(NASA-TP-1517; A-7916) Avail: NTIS HC A04/MF A01 CSCL 20D

COMPRESSIBLE FLOW, FLOW DISTRIBUTION, MATHEMATICAL MODELS, TURBULENT FLOW

## 34 FLUID MECHANICS AND HEAT TRANSFER

**N80-21702\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**VELOCITY-SPLIT NAVIER-STOKES SOLUTION PROCEDURE FOR INCOMPRESSIBLE HIGH REYNOLDS NUMBER EXTERNAL FLOWS**

D. L. DWOYER Washington Apr. 1980 36 p refs  
(NASA-TP-1655; L-13343) Avail: NTIS HC A03/MF A01  
CSCL 20D

COMPUTATIONAL FLUID DYNAMICS, INCOMPRESSIBLE FLOW, NAVIER-STOKES EQUATION, VISCOUS FLOW

**N80-22633\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**STATUS OF LINEAR BOUNDARY-LAYER STABILITY AND THE E TO THE NTH METHOD, WITH EMPHASIS ON SWEEP-WING APPLICATIONS**

J. N. HEFNER and D. M. BUSHNELL Apr. 1980 50 p refs  
(NASA-TP-1645; L-13313) Avail: NTIS HC A03/MF A01  
CSCL 20D

BOUNDARY LAYER STABILITY, LAMINAR FLOW, LOGARITHMS, PERTURBATION THEORY, SWEEP WINGS, TRANSITION PROBABILITIES

**N80-23600\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MEASURED AND PREDICTED SHOCK SHAPES AND AERODYNAMIC COEFFICIENTS FOR BLUNTED CONES AT INCIDENCE IN AIR AT MACH 5.9**

R. L. CALLOWAY and N. H. WHITE May 1980 70 p refs  
(NASA-TP-1652; L-13429) Avail: NTIS HC A04/MF A01  
CSCL 20D

AERODYNAMIC COEFFICIENTS, BLUNT BODIES, HYPERSONICS, NOSE CONES, NUMERICAL ANALYSIS, PERFORMANCE PREDICTION, SHOCK WAVES, SPACECRAFT CONFIGURATIONS

**N80-24577\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXTENSION OF SIMILARITY TEST PROCEDURES TO COOLED ENGINE COMPONENTS WITH INSULATING CERAMIC COATINGS**

H. J. GLADDEN May 1980 16 p refs  
(NASA-TP-1615; E-337) Avail: NTIS HC A02/MF A01 CSCL 20D

AIR COOLING, CERAMIC COATINGS, ENGINE PARTS, GAS TURBINE ENGINES, HEAT TRANSFER, SIMILARITY THEOREM

**N80-25588\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**PROCEEDINGS OF THE AERO-OPTICS SYMPOSIUM ON ELECTROMAGNETIC WAVE PROPAGATION FROM AIRCRAFT**

Apr. 1980 666 p refs Symp. held at Moffett Field, Calif., 14-15 Aug. 1979 Sponsored in part by AFWL  
(NASA-CP-2121; A-8090) Avail: NTIS HC A99/MF A01 CSCL 20D

AERODYNAMICS, CONFERENCES, ELECTROMAGNETIC WAVE TRANSMISSION, TURBULENCE, WAVE PROPAGATION

**N80-25615\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF VARIOUS ASSUMPTIONS ON THE CALCULATED LIQUID FRACTION IN ISENTROPIC SATURATED EQUILIBRIUM EXPANSIONS**

J. W. BURSIK (Rensselaer Polytechnic Inst., Troy, N.Y.) and R. M. HALL Jun. 1980 33 p refs  
(NASA-TP-1682; L-13437) Avail: NTIS HC A03/MF A01  
CSCL 20D

CRYOGENIC WIND TUNNELS, GAS EXPANSION, NITROGEN

**N80-26622\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NOISE REDUCTION IN A MACH 5 WIND TUNNEL WITH A RECTANGULAR ROD-WALL SOUND SHIELD**

T. R. CREEL, JR., J. W. KEYES, and I. E. BECKWITH Jun. 1980 82 p refs  
(NASA-TP-1672; L-13451) Avail: NTIS HC A05/MF A01  
CSCL 20D

BOUNDARY LAYER TRANSITION, NOISE MEASUREMENT, NOISE REDUCTION, SUPERSONIC WIND TUNNELS, WIND TUNNEL TESTS

**N80-32692\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AEROTHERMAL ANALYSIS OF A WING-ELEVON COVE WITH VARIABLE LEAKAGE**

R. L. HUNT Washington Sep. 1980 44 p refs  
(NASA-TP-1703; L-13751) Avail: NTIS HC A03/MF A01  
CSCL 20D

BOUNDARY LAYER FLOW, CONVECTIVE HEAT TRANSFER, ELEVONS, MATHEMATICAL MODELS, REENTRY EFFECTS, SATELLITE CONFIGURATIONS, SPACE SHUTTLE ORBITERS, WINGS

**N80-33719\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CALCULATION OF LAMINAR HEATING RATES ON THREE-DIMENSIONAL CONFIGURATIONS USING THE AXISYMMETRIC ANALOGUE**

H. H. HAMILTON, II Sep. 1980 80 p refs  
(NASA-TP-1698; L-13748) Avail: NTIS HC A05/MF A01  
CSCL 20D

AXISYMMETRIC FLOW, BOUNDARY LAYER EQUATIONS, COMPUTATION, LAMINAR HEAT TRANSFER, THREE DIMENSIONAL BOUNDARY LAYER

**N81-12356\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN IMPROVED VISCOUS CHARACTERISTICS ANALYSIS PROGRAM**

R. V. JENKINS Nov. 1978 158 p refs  
(NASA-TP-1289; L-12320) Avail: NTIS HC A08/MF A01  
CSCL 20D

COMPUTER PROGRAMS, DATA CONVERSION ROUTINES, FLOW DISTRIBUTION, FORTRAN, SUBROUTINES, SUPERSONIC COMBUSTION

**N81-12361\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**IN-FLIGHT BOUNDARY-LAYER MEASUREMENTS ON A HOLLOW CYLINDER AT A MACH NUMBER OF 3.0**

R. D. QUINN and L. GONG Nov. 1980 52 p refs  
(NASA-TP-1764; H-1101) Avail: NTIS HC A04/MF A01 CSCL 20D

CYLINDRICAL BODIES, HEAT TRANSFER COEFFICIENTS, MACH NUMBER, STATIC PRESSURE

**N81-13303\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EVALUATION OF FLOW QUALITY IN TWO LARGE NASA WIND TUNNELS AT TRANSONIC SPEEDS**

W. D. HARVEY, P. C. STAINBACK, and F. K. OWEN (COMPLERE Inc., Palo Alto, Calif.) Dec. 1980 76 p refs  
(NASA-TP-1737; L-13448) Avail: NTIS HC A05/MF A01  
CSCL 20D

AERODYNAMICS, FLOW VELOCITY, FREE FLOW, PRESSURE OSCILLATIONS, WIND TUNNELS



### 34 FLUID MECHANICS AND HEAT TRANSFER

**N81-15237\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AEROTHERMAL ENVIRONMENT IN CHORDWISE GAPS BETWEEN SPLIT ELEVONS AT MACH 6.8**

L. R. HUNT Dec. 1980 45 p refs  
(NASA-TP-1783; L-14076) Avail: NTIS HC A03/MF A01  
CSCL 20D

AERODYNAMIC HEATING, AEROTHERMODYNAMICS, ELEVONS, GAPS, REENTRY PHYSICS, WIND TUNNEL TESTS

**N81-16417\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CAPILLARY AND ACCELERATION WAVE BREAKUP OF LIQUID JETS IN AXIAL-FLOW AIRSTREAMS**

R. D. INGEBO Jan. 1981 13 p refs  
(NASA-TP-1791; E-537) Avail: NTIS HC A02/MF A01 CSCL 20D

AXIAL FLOW, CAPILLARY WAVES, FLUID JETS, FUEL INJECTION, LIQUID ATOMIZATION

**N81-23410\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MEAN-FLOW AND TURBULENCE MEASUREMENTS IN THE VICINITY OF THE TRAILING EDGE OF AN NACA (63 SUB 1)-012 AIRFOIL**

J. C. YU Washington May 1981 45 p refs  
(NASA-TP-1845; L-13959) Avail: NTIS HC A03/MF A01 CSCL 20D

AIRFOILS, INCOMPRESSIBLE FLOW, NEAR WAKES, REYNOLDS STRESS, TRAILING EDGES, TURBULENT BOUNDARY LAYER

**N81-24387\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SOME FLOW PHENOMENA ASSOCIATED WITH ALIGNED, SEQUENTIAL APERTURES WITH BORDA-TYPE INLETS**

R. C. HENDERICKS and T. T. STETZ May 1981 63 p refs  
(NASA-TP-1792; E-479) Avail: NTIS HC A04/MF A01 CSCL 20D

BOUNDARY LAYER SEPARATION, FLOW VISUALIZATION, INLET PRESSURE, SEPARATED FLOW

**N81-24388\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FORCED AND NATURAL CONVECTION IN LAMINAR-JET DIFFUSION FLAMES**

J. B. HAGGARD, JR. Jun. 1981 24 p refs  
(NASA-TP-1841; E-487) Avail: NTIS HC A02/MF A01 CSCL 20D

CONVECTION, DIFFUSION FLAMES, GRAVITATION THEORY, JET FLOW, LAMINAR FLOW

**N81-28389\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DEPRESSURIZATION AND TWO-PHASE FLOW OF WATER CONTAINING HIGH LEVELS OF DISSOLVED NITROGEN GAS**

R. J. SIMONEAU Jul. 1981 46 p refs  
(NASA-TP-1839; E-216) Avail: NTIS HC A03/MF A01 CSCL 20D

CRITICAL FLOW, DISSOLVED GASES, LIQUID NITROGEN, ORIFICE FLOW, PRESSURE REDUCTION, TWO PHASE FLOW

**N81-29384\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INFLUENCE OF THERMAL BOUNDARY CONDITIONS ON HEAT TRANSFER FROM A CYLINDER IN CROSS FLOW**

S. S. PAPELL Aug. 1981 10 p refs  
(NASA-TP-1894; E-627) Avail: NTIS HC A02/MF A01 CSCL 20D

CROSS FLOW, CYLINDRICAL BODIES, HEAT TRANSFER COEFFICIENTS, STAGNATION POINT, THERMAL BOUNDARY LAYER

**N81-31509\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**GORTLER VORTICES AND TRANSITION IN WALL BOUNDARY LAYERS OF TWO MACH 5 NOZZLES**

I. E. BECKWITH and B. B. HOLLEY Aug. 1981 72 p refs  
(NASA-TP-1869; L-14332) Avail: NTIS HC A04/MF A01 CSCL 20D

BOUNDARY LAYER FLOW, REYNOLDS NUMBER, VORTICES, WIND TUNNEL NOZZLES

**N81-32418\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATION OF IDEAL-GAS FLOW BY NITROGEN AND OTHER SELECTED GASES AT CRYOGENIC TEMPERATURES**

R. M. HALL and J. B. ADCOCK Sep. 1981 51 p refs  
(NASA-TP-1901; L-14587) Avail: NTIS HC A03/MF A01 CSCL 20D

CRYOGENIC WIND TUNNELS, GAS FLOW, IDEAL GAS, NITROGEN, REAL GASES, TRANSONIC WIND TUNNELS

**N82-11391\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AMPLIFIED CROSSFLOW DISTURBANCES IN THE LAMINAR BOUNDARY LAYER ON SWEEPED WINGS WITH SUCTION**

J. R. DAGENHART Nov. 1981 90 p refs  
(NASA-TP-1902; L-14423) Avail: NTIS HC A05/MF A01 CSCL 20D

BOUNDARY LAYER CONTROL, CROSS FLOW, FLOW DISTORTION, LAMINAR BOUNDARY LAYER, SUCTION, SWEEPED WINGS

**N82-13383\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AERODYNAMIC HEATING ON THE CORRUGATED SURFACE OF A 10.2 DEG HALF-ANGLE BLUNTED CONE AT MACH 6.7**

I. WEINSTEIN, D. E. AVERY, and L. R. HUNT Dec. 1981 45 p refs  
(NASA-TP-1928; L-14679) Avail: NTIS HC A03/MF A01 CSCL 20D

AERODYNAMIC HEATING, BLUNT BODIES, CONES, CORRUGATED PLATES, HEAT RESISTANT ALLOYS, THERMAL PROTECTION

**N82-20467\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FLOW THROUGH ALIGNED SEQUENTIAL ORIFICE TYPE INLETS**

R. C. HENDRICKS and T. T. STETZ Mar. 1982 53 p refs  
(NASA-TP-1967; E-682; NAS 1.60:1967) Avail: NTIS HC A04/MF A01 CSCL 20D

CHOKES (FUEL SYSTEMS), FLOW VELOCITY, ORIFICE FLOW, PRESSURE MEASUREMENT, SEALS (STOPPERS), SEPARATED FLOW

**N82-23473\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPUTATIONAL ASPECTS OF HEAT TRANSFER IN STRUCTURES**

H. M. ADELMAN, Comp. 1982 554 p refs Symp. held at Hampton, Va., 3-5 Nov. 1981; sponsored by NASA, George Washington Univ., and Old Dominion Univ.  
(NASA-CP-2216; L-15108; NAS 1.55:2216) Avail: NTIS HC A24/MF A01 CSCL 20D

AERODYNAMIC HEATING, COMPUTATION, HEAT TRANSFER, LARGE SPACE STRUCTURES, MATHEMATICAL MODELS, REENTRY EFFECTS, SPACE SHUTTLE ORBITERS, SPACECRAFT STRUCTURES, STRUCTURAL ANALYSIS, THERMAL CONDUCTIVITY

## 34 FLUID MECHANICS AND HEAT TRANSFER

**N82-30498\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **FLOW VISUALIZATION STUDY OF THE HORSESHOE VORTEX IN A TURBINE STATOR CASCADE**

R. E. GAUGLER and L. M. RUSSELL Jun. 1982 33 p refs (NASA-TP-1884; E-915; NAS 1.60:1884) Avail: NTIS HC A03/MF A01 CSCL 20D

CASCADE FLOW, STATORS, TURBINES, TWO DIMENSIONAL FLOW, VORTICES

**N82-31646\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STUDIES OF IMPLICIT AND EXPLICIT SOLUTION TECHNIQUES IN TRANSIENT THERMAL ANALYSIS OF STRUCTURES**

H. M. ADELMAN, R. T. HAFTKA, and J. C. ROBINSON Aug. 1982 47 p refs

(NASA-TP-2038; L-15245; NAS 1.60:2038) Avail: NTIS HC A03/MF A01 CSCL 20D

AEROSPACE VEHICLES, ALGORITHMS, ANALYSIS (MATHEMATICS), HEAT SHIELDING, HEAT TRANSFER, STRUCTURAL ANALYSIS

**N83-12360\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **FILM-COOLING EFFECTIVENESS WITH DEVELOPING COOLANT FLOW THROUGH STRAIGHT AND CURVED TUBULAR PASSAGES**

S. S. PAPELL, C. R. WANG, and R. W. GRAHAM Nov. 1982 21 p refs

(NASA-TP-2062; E-1206; NAS 1.60:2062) Avail: NTIS HC A02/MF A01 CSCL 20D

COOLANTS, FILM COOLING, PASSAGEWAYS, TURBINE BLADES, WALL TEMPERATURE

**N83-16674\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **FLOW IN A TORSIONALLY OSCILLATING FILLED CYLINDER**

C. F. SCHAFER Jan. 1983 20 p refs (NASA-TP-2115; NAS 1.60:2115) Avail: NTIS HC A02/MF A01 CSCL 20D

CIRCULAR CYLINDERS, CYLINDRICAL SHELLS, FLOW CHARACTERISTICS, LIQUID FILLED SHELLS, MIXING, OSCILLATIONS

**N83-16675\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PRESSURES, FORCES, MOMENTS AND SHOCK SHAPES FOR A GEOMETRICALLY MATCHED SPHERE-CONE AND HYPERBOLOID AT MACH 20.3 IN HELIUM**

R. L. CALLOWAY Jan. 1983 73 p refs (NASA-TP-2100; L-15499; NAS 1.60:2100) Avail: NTIS HC A04/MF A01 CSCL 20D

AERODYNAMIC FORCES, ATMOSPHERIC ENTRY, HELIUM, HYPERBOLAS, PRESSURE DISTRIBUTION, SPHERES, STABILITY DERIVATIVES

**N83-16680\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **MECHANICS OF LIQUID HELIUM IN A PARTIALLY FILLED ROTATING DEWAR IN LOW GRAVITY WITH APPLICATION TO GRAVITY PROBE-B**

C. F. SCHAFER and S. A. LOWRY Jan. 1983 45 p refs (NASA-TP-2124; NAS 1.60:2124) Avail: NTIS HC A03/MF A01 CSCL 20D

ASYMMETRY, FLUID MECHANICS, GRAVITY PROBE B, LIQUID HELIUM, ROTATING FLUIDS

**N83-20031\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STUDIES OF SIDEWALL BOUNDARY LAYER IN THE LANGLEY 0.3 METER TRANSONIC CRYOGENIC TUNNEL WITH AND WITHOUT SUCTION**

A. V. MURTHY, C. B. JOHNSON, E. J. RAY, P. L. LAWING, and J. J. THIBODEAUX Mar. 1983 50 p refs

(NASA-TP-2096; L-15437; NAS 1.60:2096) Avail: NTIS HC A03/MF A01 CSCL 20D

BOUNDARY LAYER CONTROL, CRYOGENIC WIND TUNNELS, MACH NUMBER, REYNOLDS NUMBER, THICKNESS

**N83-20032\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **REDUCTION METHODS FOR NONLINEAR STEADY-STATE THERMAL ANALYSIS**

A. K. NOOR, C. D. BALCH, and M. A. SHIBUT (George Washington Univ., Hampton, Va.) Mar. 1983 48 p refs

(NASA-TP-2098; L-15501; NAS 1.60:2098) Avail: NTIS HC A03/MF A01 CSCL 20D

FINITE ELEMENT METHOD, GALERKIN METHOD, NONLINEAR EQUATIONS, TEMPERATURE DISTRIBUTION, TEMPERATURE EFFECTS

**N83-22546\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **STOCHASTIC DIFFERENTIAL EQUATIONS AND TURBULENT DISPERSION**

P. A. DURBIN Apr. 1983 72 p refs

(NASA-RP-1103; E-1425; NAS 1.61:1103) Avail: NTIS HC A04/MF A01 CSCL 20D

Aspects of the theory of continuous stochastic processes that seem to contribute to an understanding of turbulent dispersion are introduced and the theory and philosophy of modelling turbulent transport is emphasized. Examples of eddy diffusion examined include shear dispersion, the surface layer, and channel flow. Modeling dispersion with finite-time scale is considered including the Langevin model for homogeneous turbulence, dispersion in nonhomogeneous turbulence, and the asymptotic behavior of the Langevin model for nonhomogeneous turbulence. A.R.H.

**N83-24800\*** National Bureau of Standards, Boulder, Colo. Thermophysical Properties Div.

### **TRANSPORT PROPERTIES OF OXYGEN**

H. M. RÖDER Apr. 1983 86 p refs (NASA ORDER C-32369-C)

(NASA-RP-1102; NAS 1.61:1102; NBSIR-82-1672) Avail: NTIS HC A05/MF A01 CSCL 20D

Tables of viscosity, thermal conductivity, and thermal diffusivity of oxygen as a function of temperature and pressure from the triple point to 320 K and at pressures to 100 MPa are presented. Auxiliary tables in engineering units are also given. Viscosity and thermal conductivity are calculated from published correlations. Density and specific heat at constant pressure, required to calculate thermal diffusivity, are obtained from an equation of state. The Prandtl number can be obtained quite easily from the values tabulated. S.L.

**N83-24808\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **CALCULATION OF INVISCID FLOW OVER SHUTTLE-LIKE VEHICLES AT HIGH ANGLES OF ATTACK AND COMPARISONS WITH EXPERIMENTAL DATA**

K. J. WEILMUNSTER and H. H. HAMILTON, II May 1983 90 p refs

(NASA-TP-2103; L-15518; NAS 1.60:2103) Avail: NTIS HC A05/MF A01 CSCL 20D

ANGLE OF ATTACK, INVISCID FLOW, SPACE SHUTTLES, SPACECRAFT CONFIGURATIONS, THREE DIMENSIONAL FLOW

### 34 FLUID MECHANICS AND HEAT TRANSFER

**N83-28378\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EFFECTS OF FLOW SEPARATION AND COVE LEAKAGE ON PRESSURE AND HEAT-TRANSFER DISTRIBUTIONS ALONG A WING-COVE-ELEVON CONFIGURATION AT MACH 6.9**

W. D. DEVEIKIS Jun. 1983 95 p refs  
 (NASA-TP-2127; L-15513; NAS 1.60:2127) Avail: NTIS HC A05/MF A01 CSCL 20D  
 CHANNEL FLOW, HEAT TRANSFER, PRESSURE DISTRIBUTION, SEPARATED FLOW, WIND TUNNEL TESTS, WINGS

**N83-34229\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FREE-STREAM NOISE AND TRANSITION MEASUREMENTS ON A CONE IN A MACH 3.5 PILOT LOW-DISTURBANCE TUNNEL**  
 I. E. BECKWITH, T. R. CREEL, JR., F. J. CHEN (Systems and Applied Sciences Corp.), and J. M. KENDALL (JPL) Sep. 1983 70 p refs  
 (NASA-TP-2180; L-15610; NAS 1.60:2180) Avail: NTIS HC A04/MF A01 CSCL 20D  
 BOUNDARY LAYER TRANSITION, MACH NUMBER, NOISE (SOUND), SUPERSONIC WIND TUNNELS

**N83-34232\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THREE-DIMENSIONAL TURBULENT-MIXING-LENGTH MODELING FOR DISCRETE-HOLE COOLANT INJECTION INTO A CROSSFLOW**  
 C. R. WANG and S. S. PAPELL Sep. 1983 16 p refs  
 (NASA-TP-2200; E-1497; NAS 1.60:2200) Avail: NTIS HC A02/MF A01 CSCL 20D  
 ENGINE COOLANTS, FILM COOLING, MIXING LENGTH FLOW THEORY, TEMPERATURE EFFECTS, THREE DIMENSIONAL FLOW, TURBULENCE

**N84-10504\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**PRESSURE AND HEATING-RATE DISTRIBUTIONS ON A CORRUGATED SURFACE IN A SUPERSONIC TURBULENT BOUNDARY LAYER**

J. W. SAWYER Nov. 1977 84 p refs  
 (NASA-TP-1024; L-11732; NAS 1.60:1024) Avail: NTIS HC A05/MF A01 CSCL 20D  
 CORRUGATED PLATES, HEATING, PRESSURE DISTRIBUTION, SUPERSONIC BOUNDARY LAYERS, TURBULENT BOUNDARY LAYER

**N84-13500\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**THE DISTURBANCE FLOW FIELD PRODUCED BY AN EVOLVING VORTEX**

T. B. GATSKI Dec. 1983 35 p refs  
 (NASA-TP-2245; L-15670; NAS 1.60:2245) Avail: NTIS HC A03/MF A01 CSCL 20D  
 SHEAR FLOW, VISCOUS FLOW, VORTICES

**N84-15427\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**LIQUID MANAGEMENT IN LOW GRAVITY USING BAFFLED ROTATING CONTAINERS**  
 R. F. GANS Jan. 1984 24 p refs  
 (NASA-TP-2263; NAS 1.60:2263) Avail: NTIS HC A02/MF A01 CSCL 20D

BAFFLES, CYLINDRICAL SHELLS, FLUID MANAGEMENT, LIQUID FILLED SHELLS, REDUCED GRAVITY, ROTATING CYLINDERS

**N84-17525\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**HOT-FLOW TESTS OF A SERIES OF 10-PERCENT-SCALE TURBOFAN FORCED MIXING NOZZLES**  
 V. L. HEAD, L. A. POVINELLI, and W. H. GERSTENMAIER Jan. 1984 95 p refs  
 (NASA-TP-2268; E-1746; NAS 1.60:2268) Avail: NTIS HC A05/MF A01 CSCL 20D  
 MIXING LENGTH FLOW THEORY, PRESSURE MEASUREMENT, STATIC PRESSURE, TURBOFAN ENGINES

**N84-17534\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CORRELATIONS OF SUPERSONIC BOUNDARY-LAYER TRANSITION ON CONES INCLUDING EFFECTS OF LARGE AXIAL VARIATIONS IN WIND-TUNNEL NOISE**  
 F. J. CHEN (Systems and Applied Sciences Corp.), I. E. BECKWITH, and T. R. CREEL, JR. Jan. 1984 56 p refs  
 (NASA-TP-2229; NAS 1.60:2229; L-15669) Avail: NTIS HC A04/MF A01 CSCL 20D  
 AERODYNAMIC NOISE, BOUNDARY LAYER TRANSITION, CONES, MACH NUMBER, WIND TUNNELS

**N84-19741\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND THEORETICAL DEPOSITION RATES FROM SALT-SEEDED COMBUSTION GASES OF A MACH 0.3 BURNER RIG**  
 G. J. SANTORO, F. J. KOHL, C. A. STEARNS, S. A. GOEKOGLU (Analex Corp.), and D. E. ROSNER (Yale Univ.) Mar. 1984 46 p refs  
 (NAS3-23293; NAG3-201)  
 (NASA-TP-2225; E-1752; NAS 1.60:2225) Avail: NTIS HC A03/MF A01 CSCL 20D  
 DEPOSITION, HEAT TRANSFER, MASS TRANSFER

**N84-21828\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**REVIEW AND STATUS OF HEAT-TRANSFER TECHNOLOGY FOR INTERNAL PASSAGES OF AIR-COOLED TURBINE BLADES**  
 F. C. YEH and F. S. STEPKA Apr. 1984 36 p refs  
 (NASA-TP-2232; E-1373; NAS 1.60:2232) Avail: NTIS HC A03/MF A01 CSCL 20D  
 AIR COOLING, AIR FLOW, HEAT TRANSFER, PASSAGEWAYS, TURBINE BLADES, TURBULENT FLOW

**N84-22906\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN ANALYSIS OF SHOCK COALESCENCE INCLUDING THREE-DIMENSIONAL EFFECTS WITH APPLICATION TO SONIC BOOM EXTRAPOLATION** Ph.D. Thesis - George Washington Univ.  
 C. M. DARDEN Jan. 1984 77 p refs  
 (NASA-TP-2214; L-15660; NAS 1.60:2214) Avail: NTIS HC A05/MF A01 CSCL 20D  
 COALESCING, SHOCK WAVES, SONIC BOOMS, SUPERSONIC FLOW

**N84-22907\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HYBRID PERTURBATION/BUBNOV-GALERKIN TECHNIQUE FOR NONLINEAR THERMAL ANALYSIS**  
 A. K. NOOR (George Washington Univ.) and C. D. BALCH (George Washington Univ.) Jun. 1983 28 p refs  
 (NASA-TP-2145; L-15584; NAS 1.60:2145) Avail: NTIS HC A03/MF A01 CSCL 20D  
 CONDUCTION, CONVECTION, HEAT TRANSFER, NONLINEAR SYSTEMS, PERTURBATION, THERMAL ANALYSIS

## 34 FLUID MECHANICS AND HEAT TRANSFER

**N84-23852\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**FINITE-DIFFERENCE FLUID DYNAMICS COMPUTER MATHEMATICAL MODELS FOR THE DESIGN AND INTERPRETATION OF EXPERIMENTS FOR SPACE FLIGHT**  
 G. O. ROBERTS (Roberts Associates, Inc.), W. W. FOWLIS, and T. L. MILLER May 1984 16 p refs  
 (NASA-TP-2323; NAS 1.60:2323) Avail: NTIS HC A02/MF A01 CSCL 05H

EXPERIMENT DESIGN, FINITE DIFFERENCE THEORY, FLUID DYNAMICS, MATHEMATICAL MODELS, SPACEBORNE EXPERIMENTS, SPACELAB PAYLOADS

**N84-25944\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**DRAG OF TWO-DIMENSIONAL SMALL-AMPLITUDE SYMMETRIC AND ASYMMETRIC WAVY WALLS IN TURBULENT BOUNDARY LAYERS**

J. C. LIN, M. J. WALSH, and R. BALASUBRAMANIAN (Cambridge Hydrodynamics, Inc., Lexington, Mass.) Jun. 1984 165 p refs  
 (NASA-TP-2318; L-15761; NAS 1.60:2318) Avail: NTIS HC A08/MF A01 CSCL 20D

DRAG, LOW SPEED, SINE WAVES, SKIN FRICTION, TURBULENT BOUNDARY LAYER, TURBULENT FLOW

**N84-31561\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ELECTROLESS-PLATING TECHNIQUE FOR FABRICATING THIN-WALL CONVECTIVE HEAT-TRANSFER MODELS**

D. E. AVERY, G. K. BALLARD, and M. L. WILSON Aug. 1984 39 p refs  
 (NASA-TP-2349; L-15815; NAS 1.60:2349) Avail: NTIS HC A03/MF A01 CSCL 20D

ELECTROLESS DEPOSITION, HEAT SHIELDING, HEAT TRANSFER, PLATING, SPACECRAFT DESIGN, THERMAL INSULATION, THIN WALLED SHELLS, TILES

**N85-12313\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL AND PREDICTED HEATING DISTRIBUTIONS FOR BICONICS AT INCIDENCE IN AIR AT MACH 10**

C. G. MILLER, III Nov. 1984 118 p refs  
 (NASA-TP-2334; L-15785; NAS 1.60:2334) Avail: NTIS HC A06/MF A01 CSCL 20D

AERODYNAMIC HEATING, AEROTHERMODYNAMICS, CONICAL BODIES, HEAT TRANSFER, HYPERSONIC FLOW, WIND TUNNEL TESTS

**N85-12314\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**VORTEX-GENERATING COOLANT-FLOW-PASSAGE DESIGN FOR INCREASED FILM-COOLING EFFECTIVENESS AND SURFACE COVERAGE**

S. S. PAPELL Nov. 1984 24 p refs  
 (NASA-TP-2388; E-2147; NAS 1.60:2388) Avail: NTIS HC A02/MF A01 CSCL 20D

DUCTS, ENGINE COOLANTS, FILM COOLING, FLOW CHARACTERISTICS, PASSAGEWAYS, VORTICES

**N85-13175\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**A PRELIMINARY STUDY OF NUMERICAL SIMULATION OF THERMOSOLUTAL CONVECTION OF INTEREST TO CRYSTAL GROWTH**

T. L. MILLER Nov. 1984 33 p refs  
 (NASA-TP-2394; NAS 1.60:2394) Avail: NTIS HC A03/MF A01 CSCL 20D

CONVECTION, CRYSTAL GROWTH, FLUID FLOW, MATHEMATICAL MODELS

**N85-14078\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FLOW RATES AND PRESSURE PROFILES FOR ONE TO FOUR AXIALLY ALINED BORDA INLETS**

R. C. HENDRICKS and T. T. STETZ Dec. 1984 32 p refs  
 (NASA-TP-2390; E-1979; NAS 1.60:2390) Avail: NTIS HC A03/MF A01 CSCL 20A

FLOW VELOCITY, INLET FLOW, INLET PRESSURE, INTAKE SYSTEMS

**N85-16065\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LAMINAR HEAT-TRANSFER DISTRIBUTIONS ON BICONICS AT INCIDENCE IN HYPERSONIC-HYPERVELOCITY FLOWS**

C. G. MILLER, III, J. R. MICOL, and P. A. GNOFFO Jan. 1984 145 p refs  
 (NASA-TP-2213; L-15645; NAS 1.60:2213) Avail: NTIS HC A07/MF A01 CSCL 20D

HYPERSONIC FLOW, HYPERVELOCITY FLOW, LAMINAR HEAT TRANSFER, NOSE CONES, THERMOCHEMISTRY

**N85-16066\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**REDUCTION METHOD FOR THERMAL ANALYSIS OF COMPLEX AEROSPACE STRUCTURES**

C. P. SHORE Jan. 1985 31 p refs  
 (NASA-TP-2373; L-15777; NAS 1.60:2373) Avail: NTIS HC A03/MF A01 CSCL 20D

AEROSPACE ENGINEERING, ANTENNAS, OPTIMIZATION, SPACE SHUTTLES, STRUCTURAL ANALYSIS, THERMAL ANALYSIS, WINGS

**N85-17322\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AEROTHERMAL TESTS OF A 12.5 PERCENT CONE AT MACH 6.7 FOR VARIOUS REYNOLDS NUMBERS, ANGLES OF ATTACK AND NOSE SHAPES**

R. J. NOWAK, C. W. ALBERTSON, and L. R. HUNT Jan. 1984 90 p refs  
 (NASA-TP-2345; L-15729; NAS 1.60:2345) Avail: NTIS HC A05/MF A01 CSCL 20D

AERODYNAMIC HEATING, BOUNDARY LAYER TRANSITION, CONES, FLOW DISTRIBUTION, LAMINAR BOUNDARY LAYER, SHOCK LAYERS, TURBULENT BOUNDARY LAYER

**N85-20270\*#** North American Aviation, Inc., Torrance, Calif.

**FLOW THROUGH VERY POROUS SCREENS**

P. A. DURBIN and K. K. MURAMOTO Mar. 1985 13 p refs  
 (NASA-TP-2436; E-2360; NAS 1.60:2436) Avail: NTIS HC A02/MF A01 CSCL 20D

DRAG MEASUREMENT, FLOW CHARACTERISTICS, FLOW DISTRIBUTION, PROTECTORS, RESISTANCE, WIRE CLOTH

**N85-25757\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**A CRITICAL EVALUATION OF VARIOUS TURBULENCE MODELS AS APPLIED TO INTERNAL FLUID FLOWS**

M. NALLASAMY May 1985 72 p refs  
 (NASA-TP-2474; NAS 1.60:2474) Avail: NTIS HC A04/MF A01 CSCL 20D

COMPUTATIONAL FLUID DYNAMICS, MATHEMATICAL MODELS, TURBULENT FLOW

**N85-27165\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FLOW RATE AND PRESSURE PROFILES FOR 1 TO 4 AXIALLY ALINED ORIFICE INLETS**

R. C. HENDRICKS and T. T. STETZ May 1985 44 p refs  
 (NASA-TP-2460; E-1980; NAS 1.60:2460) Avail: NTIS HC A03/MF A01 CSCL 20D

FLOW VELOCITY, INLET FLOW, ORIFICE FLOW, ORIFICES, PRESSURE DISTRIBUTION

## 35 INSTRUMENTATION AND PHOTOGRAPHY

**N85-28260\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **FLUID SURFACE BEHAVIOR IN LOW GRAVITY. CENTER DISCRETIONARY FUND NO. 83-21 Final Report**

F. LESLIE, R. F. GANS, and C. SCHAFER Jun. 1985 28 p refs

(NASA-TP-2486; NAS 1.60:2486) Avail: NTIS HC A03/MF A01 CSCL 20D

BUBBLES, FLUID MECHANICS, GRAVITATION, REDUCED GRAVITY, SHAPES, STABILITY

**N85-31433\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **TRANSITION IN TURBINES**

Washington Jul. 1985 224 p refs Symp. held in Cleveland, 15-16 May 1984

(NASA-CP-2386; E-2456; NAS 1.55:2386) Avail: NTIS HC A10/MF A01 CSCL 20D

BOUNDARY LAYER TRANSITION, EQUATIONS OF MOTION, FLOW CHARACTERISTICS, FLUID MECHANICS, HEAT TRANSFER, TURBULENCE, TURBULENT BOUNDARY LAYER

**N85-34351\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EXPERIMENTAL AERODYNAMIC HEATING TO SIMULATED SPACE SHUTTLE TILES IN LAMINAR AND TURBULENT BOUNDARY LAYERS WITH VARIABLE FLOW ANGLES AT A NOMINAL MACH NUMBER OF 7 M.S. Thesis - George Washington Univ., Nov. 1983**

D. E. AVERY Aug. 1985 50 p refs Original contains color illustrations

(NASA-TP-2307; L-15781; NAS 1.60:2307) Avail: NTIS HC A03/MF A01 CSCL 20D

COLD SURFACES, HEAT SHIELDING, HYPERSONIC FLOW, IMPINGEMENT, REUSABLE HEAT SHIELDING, THERMAL PROTECTION, TILES, TURBULENT BOUNDARY LAYER, TURBULENT FLOW

**N86-14530\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **SLIP-BOUNDARY EQUATIONS FOR MULTICOMPONENT NONEQUILIBRIUM AIRFLOW**

R. N. GUPTA, C. D. SCOTT, and J. N. MOSS Nov. 1985 58 p refs

(NASA-TP-2452; L-15952; NAS 1.60:2452) Avail: NTIS HC A04/MF A01 CSCL 20D

AIR FLOW, BOUNDARY LAYER EQUATIONS, FLIGHT PATHS, HIGH ALTITUDE ENVIRONMENTS, LOW DENSITY RESEARCH, LOW REYNOLDS NUMBER, NONEQUILIBRIUM FLOW, SLIP FLOW, SPACECRAFT TRAJECTORIES, VELOCITY DISTRIBUTION

**N86-20720\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STUDIES OF CONDENSATION EFFECTS ON AIRFOIL TESTING IN THE LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL**

R. M. HALL Jan. 1986 34 p refs Previously announced in IAA as A85-19603

(NASA-TP-2509; L-16021; NAS 1.60:2509) Avail: NTIS HC A03/MF A01 CSCL 20D

AIRFOILS, CONDENSATION NUCLEI, CRYOGENIC WIND TUNNELS, TRANSONIC WIND TUNNELS, WIND TUNNEL TESTS

**N86-23851\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **ANALYTICAL AND NUMERICAL STUDIES OF THE THERMOCAPILLARY FLOW IN A UNIFORMLY FLOATING ZONE**

W. W. FOWLIS and G. O. ROBERTS (Roberts Associates, Inc., Vienna, Va.) 1986 42 p refs

(NASA-TP-2576; NAS 1.60:2576) Avail: NTIS HC A03/MF A01 CSCL 20D

CAPILLARY FLOW, CRYSTAL GROWTH, FLOAT ZONES, SPACE MANUFACTURING, WEIGHTLESSNESS

## 35

## INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

**N77-32458\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AN OPTICAL PROFILOMETER FOR SPATIAL CHARACTERIZATION OF THREE-DIMENSIONAL SURFACES**

W. L. KELLY, IV, E. E. BURCHER, and M. W. SKOLAUT, JR. Sep. 1977 22 p refs

(NASA-TP-1012; L-11706) Avail: NTIS HC A02/MF A01 CSCL 14B

EQUIPMENT SPECIFICATIONS, OPTICAL MEASURING INSTRUMENTS, PHOTOELASTIC ANALYSIS, PROFILOMETERS

**N78-13408\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A GAS FILTER CORRELATION MONITOR FOR CO, CH4, AND HCL**

D. I. SEBACHER Dec. 1977 30 p refs

(NASA-TP-1113; L-11868) Avail: NTIS HC A03/MF A01 CSCL 14B

AIR POLLUTION, CARBON MONOXIDE, HYDROGEN CHLORIDES, INFRARED FILTERS, METHANE, POLLUTION MONITORING

**N78-15463\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **RECOVERY AND RADIATION CORRECTIONS AND TIME CONSTANTS OF SEVERAL SIZES OF SHIELDED AND UNSHIELDED THERMOCOUPLE PROBES FOR MEASURING GAS TEMPERATURE**

G. E. GLAWE, R. HOLANDA, and L. N. KRAUSE Jan. 1978 30 p refs

(NASA-TP-1099; E-9289) Avail: NTIS HC A03/MF A01 CSCL 14B

GAS TEMPERATURE, HEAT SHIELDING, THERMOCOUPLES

**N78-17360\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **NASA GROUND-BASED AND SPACE-BASED LASER RANGING SYSTEMS**

M. W. FITZMAURICE Jan. 1978 28 p refs

(NASA-TP-1149; G-7802-F03) Avail: NTIS HC A03/MF A01 CSCL 20E

GROUND BASED CONTROL, LASER RANGER/TRACKER, SATELLITE-BORNE PHOTOGRAPHY

## 35 INSTRUMENTATION AND PHOTOGRAPHY

**N78-21430\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A SMALL GAS INLET SYSTEM FOR ORBITAL MASS-SPECTROMETER CALIBRATIONS**

A. SMITH and R. E. STELL Apr. 1978 33 p refs  
(NASA-TP-1170; L-11988) Avail: NTIS HC A03/MF A01  
CSCL 14B

CALIBRATING, DUAL AIR DENSITY EXPLORER, INTAKE SYSTEMS, MASS SPECTROMETERS

**N78-21431\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A FEASIBILITY STUDY OF ION IMPLANTATION TECHNIQUES FOR MASS SPECTROMETER CALIBRATION**

M. E. KOSLIN (Rensselaer Polytech. Inst.), G. A. KRYCUK (Rensselaer Polytech. Inst.), J. G. SCHATZ, JR. (Rensselaer Polytech. Inst.), F. A. WHITE (Rensselaer Polytech. Inst.), and G. M. WOOD Apr. 1978 21 p refs  
(NASA-TP-1185; L-11920) Avail: NTIS HC A02/MF A01  
CSCL 14B

CALIBRATING, FEASIBILITY ANALYSIS, ION IMPLANTATION, MASS SPECTROMETERS

**N78-28412\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

### **TOTAL OZONE MEASUREMENT: INTERCOMPARISON OF PROTOTYPE NEW ZEALAND FILTER INSTRUMENT AND DOBSON SPECTROPHOTOMETER**

R. E. BASHER Jul. 1978 17 p refs  
(NASA-TP-1277) Avail: NTIS HC A02/MF A01 CSCL 14B

CALIBRATING, INSTRUMENT ERRORS, MEASURING INSTRUMENTS, OZONOMETRY

**N79-17195\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **HOLOGRAPHY THROUGH OPTICALLY ACTIVE WINDOWS**

A. J. DECKER Feb. 1979 18 p refs  
(NASA-TP-1414; E-9808) Avail: NTIS HC A02/MF A01 CSCL 14E

FLOW VISUALIZATION, HOLOGRAPHY, IMAGING TECHNIQUES, OPTICAL ACTIVITY, WINDOWS (APERTURES)

**N79-21329\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SIMULATED ELECTRONIC HETERODYNE RECORDING AND PROCESSING OF PULSED-LASER HOLOGRAMS**

A. J. DECKER Apr. 1979 40 p refs  
(NASA-TP-1444; E-9813) Avail: NTIS HC A03/MF A01 CSCL 14E

ELECTRONIC RECORDING SYSTEMS, HOLOGRAPHY, MATHEMATICAL MODELS, OPTICAL HETERODYNING, PULSED LASERS, SPATIAL FILTERING

**N80-12384\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **PRELIMINARY APPLICATIONS AND EVALUATION RESULTS. LIXISCOPE: PROCEEDINGS OF THE LIXISCOPE CONFERENCE**

Jul. 1978 89 p refs Conf. held at Greenbelt, Md., 27-28 Jul. 1978

(NASA-CP-2112) Avail: NTIS HC A05/MF A01 CSCL 14E  
CONFERENCES, FLUOROSCOPY, OPTICAL MEASURING INSTRUMENTS, PORTABLE EQUIPMENT, X RAY IMAGERY

**N80-12399\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **DETERMINATION OF NOISE EQUIVALENT REFLECTANCE FOR A MULTISPECTRAL SCANNER: A SCANNER SENSITIVITY STUDY**

D. E. GIBBONS (Fort Lewis Coll., Durango, Colo.) and R. R. RICHARD Dec. 1979 31 p refs  
(NASA-TP-1575; S-497) Avail: NTIS HC A03/MF A01 CSCL 14E

MULTISPECTRAL BAND SCANNERS, PHOTSENSITIVITY, WHITE NOISE

**N80-13430\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **INSTRUMENT ERROR ANALYSIS AS IT APPLIES TO WIND-TUNNEL TESTING**

E. RIND Dec. 1979 61 p  
(NASA-TP-1572; L-13222) Avail: NTIS HC A04/MF A01  
CSCL 14B

ERROR ANALYSIS, INSTRUMENT ERRORS, WIND TUNNEL MODELS, WIND TUNNEL TESTS

**N80-22660\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ALIASED NOISE IN RADIOMETRIC MEASUREMENTS**

F. O. HUCK, S. K. PARK, N. HALYO, and S. T. STALLMAN May 1980 26 p refs  
(NASA-TP-1639; L-13410) Avail: NTIS HC A03/MF A01  
CSCL 14B

BACKGROUND NOISE, ERROR ANALYSIS, IMAGE RECONSTRUCTION, IMAGE RESOLUTION, NOISE MEASUREMENT, RADIOMETERS

**N80-24594\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A SCANNING LASER-VELOCIMETER TECHNIQUE FOR MEASURING TWO-DIMENSIONAL WAKE-VORTEX VELOCITY DISTRIBUTIONS**

L. R. GARTRELL and D. B. RHODES 23 May 1980 43 p refs  
(NASA-TP-1661; L-13426) Avail: NTIS HC A03/MF A01  
CSCL 14B

AIRCRAFT WAKES, LASER DOPPLER VELOCIMETERS, SCANNERS, VELOCITY MEASUREMENT, VORTICES, WIND TUNNEL TESTS

**N80-24595\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **DYNAMIC BEHAVIOR OF A BEAM DRAG-FORCE ANEMOMETER**

G. C. FRALICK Washington May 1980 16 p refs  
(NASA-TP-1687; E-340) Avail: NTIS HC A02/MF A01 CSCL 14B

AERODYNAMIC DRAG, ANEMOMETERS, CANTILEVER BEAMS, DYNAMIC RESPONSE, LOADS (FORCES), VELOCITY MEASUREMENT

**N80-25635\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **COMPUTERIZED VIDEO DENSITOMETRY METHOD FOR RAPID ANALYSIS OF INFRARED PHOTOGRAPHIC IMAGES**

E. ROBERTS, JR., F. D. CALFO, and F. G. POLLACK Jun. 1980 13 p refs  
(NASA TP-1686; E-354) Avail: NTIS HC A05/MF A01  
CSCL 14E

DENSITY MEASUREMENT, IMAGE PROCESSING, INFRARED PHOTOGRAPHY, MICRODENSITOMETERS, TEMPERATURE DISTRIBUTION, TURBINE BLADES

**N80-30716\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

## MARS 1414 RECORDER ENVIRONMENTAL TESTS

D. LANGJAHR Aug. 1980 31 p  
(NASA-TP-1709; REPT-80F5124) Avail: NTIS HC A03/MF A01 CSCL 14E

AIRBORNE EQUIPMENT, ALTITUDE, AMBIENT TEMPERATURE, ENVIRONMENTAL TESTS, GRAPHS (CHARTS)

**N80-30717\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## DIAL WITH HETERODYNE DETECTION INCLUDING SPECKLE NOISE: AIRCRAFT/SHUTTLE MEASUREMENTS OF O<sub>3</sub>, H<sub>2</sub>O, AND NH<sub>3</sub> WITH PULSED TUNABLE CO<sub>2</sub> LASERS

P. BROCKMAN, R. V. HESS, L. D. STATON, and C. H. BAIR Aug. 1980 14 p refs Presented at Intern. Conf. on Heterodyne Systems and Technol., Williamsburg, Va. 25-27 Mar. 1980 Submitted for publication  
(NASA-TP-1725; L-13876) Avail: NTIS HC A02/MF A01 CSCL 20E

AMMONIA, CARBON DIOXIDE LASERS, ELECTROMAGNETIC NOISE, HETERODYNING, OPTICAL RADAR, OZONE, SPECKLE PATTERNS, WATER VAPOR

**N81-23432\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## NASA METROLOGY AND CALIBRATION, 1980 Final Report

Washington NASA 10 Apr. 1981 153 p refs Proceedings of the 4th Ann. Workshop, Hampton, Va., 21-23 Oct. 1980 (NASA-CP-2174; L-14380) Avail: NTIS HC A08/MF A01 CSCL 13B

CALIBRATING, CONFERENCES, METROLOGY, QUALITY CONTROL, STANDARDIZATION

**N81-25352\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## DESIGN AND ANALYSIS OF A TORSION BRAID PENDULUM DISPLACEMENT TRANSDUCER

E. RIND and E. L. BRYANT Jun. 1981 63 p refs  
(NASA-TP-1840; L-14183) Avail: NTIS HC A04/MF A01 CSCL 14B

ERROR ANALYSIS, MECHANICAL PROPERTIES, OPTICAL EQUIPMENT, PENDULUMS, TECHNOLOGY ASSESSMENT, TRANSDUCERS

**N81-33452\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## APPLICATION OF INFORMATION THEORY TO THE DESIGN OF LINE-SCAN IMAGING SYSTEMS

F. O. HUCK, S. K. PARK, N. HALYO, and S. STALLMAN Sep. 1981 40 p refs Prepared in cooperation with Information and Control Systems, Hampton, Va.  
(NASA-TP-1897; L-14542) Avail: NTIS HC A03/MF A01 CSCL 14B

IMAGING TECHNIQUES, INFORMATION THEORY, MODULATION TRANSFER FUNCTION

**N82-15383\*#** Desert Research Inst., Reno, Nev.  
**THE THIRD INTERNATIONAL CLOUD CONDENSATION NUCLEI WORKSHOP Final Report**

W. C. KOCMOND, C. R. ROGERS, ed., and S. W. REA, ed. Nov. 1981 287 p refs Workshop held in Reno, Nev., 6-17 Oct. 1980; sponsored in part by NSF  
(NAS8-33820)

(NASA-CP-2212) Avail: NTIS HC A13/MF A01 CSCL 14B  
AEROSOLS, CLOUD PHYSICS, CONDENSING, CONFERENCES, ICE NUCLEI, NUCLEATION, PARTICLE SIZE DISTRIBUTION

**N82-19521\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## HIGH-SPEED LASER ANEMOMETER SYSTEM FOR INTRATOR FLOW MAPPING IN TURBOMACHINERY

J. A. POWELL, A. J. STRAZISAR, and R. G. SEASHOLTZ Feb. 1982 22 p refs  
(NASA-TP-1663; E-276) Avail: NTIS HC A02/MF A01 CSCL 14B

COMPRESSOR ROTORS, FLOW VELOCITY, LASER ANEMOMETERS, TRANSONIC FLOW, TURBOMACHINERY

**N82-22481\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## FRINGE LOCALIZATION REQUIREMENTS FOR THREE-DIMENSIONAL FLOW VISUALIZATION OF SHOCK WAVES IN DIFFUSE-ILLUMINATION DOUBLE-PULSE HOLOGRAPHIC INTERFEROMETRY

A. J. DECKER Apr. 1982 45 p refs  
(NASA-TP-1868; NAS 1.60:1868; E-757) Avail: NTIS HC A03/MF A01 CSCL 14E

FLOW VISUALIZATION, HOLOGRAPHIC INTERFEROMETRY, SHOCK WAVES, THREE DIMENSIONAL FLOW

**N82-23515\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

## POCKELS-EFFECT CELL FOR GAS-FLOW SIMULATION

D. WEIMER May 1982 19 p refs  
(NASA-TP-2007; E-1028; NAS 1.60:2007) Avail: NTIS HC A02/MF A01 CSCL 14B

BIREFRINGENCE, CRYSTAL OPTICS, ELECTRIC FIELDS, ELECTRO-OPTICS, GAS FLOW, REFRACTIVITY

**N82-26637\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## TROPOSPHERIC PASSIVE REMOTE SENSING

L. S. KEAFER, JR., ed. Jun. 1982 95 p refs Proc. of a Workshop held in Virginia Beach, Va., 20-23 Jul. 1981  
(NASA-CP-2237; L-15390; NAS 1.55:2237) Avail: NTIS HC A05/MF A01 CSCL 14B

ATMOSPHERIC COMPOSITION, PRODUCT DEVELOPMENT, REMOTE SENSORS, TECHNOLOGY ASSESSMENT, TRACE CONTAMINANTS, TROPOSPHERE

**N82-27706\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

## ABSTRACTS OF PAPERS PRESENTED AT THE ELEVENTH INTERNATIONAL LASER RADAR CONFERENCE

Jun. 1982 267 p refs Conf. held at Madison, Wisc., 21-25 Jun. 1982; sponsored in part by Wisconsin Univ., Am. Meteorol. Soc., AFOSR, and Air Force Geophys. Lab.  
(NASA-CP-2228; L-15380; NAS 1.55:2228) Avail: NTIS HC A12/MF A01 CSCL 14B

CONFERENCES, MESOSPHERE, METEOROLOGICAL PARAMETERS, OPTICAL RADAR, REMOTE SENSING

**N82-29577\*#** Systematics General Corp., McLean, Va.  
**HANDBOOK OF SENSOR TECHNICAL CHARACTERISTICS**

S. TANNER Jul. 1982 333 p refs  
(NASW-3398)  
(NASA-RP-1087; NAS 1.61:1087) Avail: NTIS HC A15/MF A01 CSCL 14B

Space and terrestrial applications remote sensor systems are described. Each sensor is presented separately. Information is included on its objectives, description, technical characteristics, data products obtained, data archives location, period of operation, and measurement and potential derived parameters. Each sensor is cross indexed.  
Author

## 35 INSTRUMENTATION AND PHOTOGRAPHY

**N82-29579\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **MAGNETIC TAPE RECORDING FOR THE EIGHTIES**

F. KALIL, ed. Apr. 1982 176 p refs  
(NASA-RP-1075; NAS 1.61:1075) CSCL 14E

The practical and theoretical aspects of state-of-the-art magnetic tape recording technology are reviewed. Topics covered include the following: (1) analog and digital magnetic tape recording, (2) tape and head wear, (3) wear testing, (4) magnetic tape certification, (5) care, handling, and management of magnetic tape, (6) cleaning, packing, and winding of magnetic tape, (7) tape reels, bands, and packaging, (8) coding techniques for high-density digital recording, and (9) tradeoffs of coding techniques. Author

**N82-32663\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **FLOW VISUALIZATION AND LASER VELOCIMETRY FOR WIND TUNNELS**

W. W. HUNTER, JR., ed. and J. T. FOUGHNER, JR., ed. Sep. 1982 354 p refs Workshop held in Hampton, Va., 25-26 Mar. 1982

(NASA-CP-2243; L-15498; NAS 1.55:2243) Avail: NTIS HC A16/MF A01 CSCL 14B

CRYOGENIC WIND TUNNELS, FLOW DISTRIBUTION, FLOW VISUALIZATION, LASER DOPPLER VELOCIMETERS, TRANSONIC WIND TUNNELS, WIND TUNNEL MODELS

**N83-28410\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **RADIOMETER REQUIREMENTS FOR EARTH-OBSERVATION SYSTEMS USING LARGE SPACE ANTENNAS**

L. S. KEAFER, JR. and R. F. HARRINGTON Jun. 1983 44 p refs  
(NASA-RP-1101; L-15429; NAS 1.61:1101) Avail: NTIS HC A03/MF A01 CSCL 14B

Requirements are defined for Earth observation microwave radiometry for the decade of the 1990's by using large space antenna (LSA) systems with apertures in the range from 50 to 200 m. General Earth observation needs, specific measurement requirements, orbit mission guidelines and constraints, and general radiometer requirements are defined. General Earth observation needs are derived from NASA's basic space science program. Specific measurands include soil moisture, sea surface temperature, salinity, water roughness, ice boundaries, and water pollutants. Measurements are required with spatial resolution from 10 to 1 km and with temporal resolution from 3 days to 1 day. The primary orbit altitude and inclination ranges are 450 to 2200 km and 60 to 98 deg, respectively. Contiguous large scale coverage of several land and ocean areas over the globe dictates large (several hundred kilometers) swaths. Radiometer measurements are made in the bandwidth range from 1 to 37 GHz, preferably with dual polarization radiometers with a minimum of 90 percent beam efficiency. Reflector surface, root mean square deviation tolerances are in the wavelength range from 1/30 to 1/100. Author

**N83-33126\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **RAINBOW SCHLIEREN**

W. L. HOWES May 1983 21 p refs Original contains color illustrations  
(NASA-TP-2166; E-1173; NAS 1.60:2166) Avail: NTIS HC A02/MF A01 CSCL 14B

NONUNIFORMITY, RAINBOWS, REFRACTIVITY, SCHLIEREN PHOTOGRAPHY

**N84-11460\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PROPOSED FAST-RESPONSE OXYGEN MONITORING AND CONTROL SYSTEM FOR THE LANGLEY 8-FOOT HIGH-TEMPERATURE TUNNEL**

J. J. SINGH, W. T. DAVIS, and R. L. PUSTER Nov. 1983 30 p refs

(NASA-TP-2218; L-15666; NAS 1.60:2218) Avail: NTIS HC A03/MF A01 CSCL 14B

AIR BREATHING ENGINES, AUTOMATIC CONTROL, HIGH TEMPERATURE, MONITORS, OXYGEN, WIND TUNNELS

**N84-28020\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **ASTRONOMICAL MICRODENSITOMETRY CONFERENCE**

D. A. KLINGLESMTIH, ed. Jul. 1984 415 p refs  
(NASA-CP-2317; GFSC-84F5182; NAS 1.55:2317) Avail: NTIS HC A18/MF A01 CSCL 14E

ASTRONOMICAL PHOTOMETRY, DATA RETRIEVAL, DATA STORAGE, DESIGN ANALYSIS, MICRODENSITOMETERS, OPTICAL MEASUREMENT, OPTICAL SCANNERS, PERFORMANCE TESTS, TECHNOLOGICAL FORECASTING

**N85-16099\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **EFFECT OF FIVE LUBRICANTS ON LIFE OF AISI 9310 SPUR GEARS**

D. P. TOWNSEND and E. V. ZARETSKY Jan. 1985 15 p refs

(NASA-TP-2419; E-2183; NAS 1.60:2419) Avail: NTIS HC A02/MF A01 CSCL 13I

ADDITIVES, FATIGUE TESTS, GEARS, LUBRICANTS, SURFACE PROPERTIES, WEAR

**N85-16100\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **INTEGRATED EXHAUST GAS ANALYSIS SYSTEM FOR AIRCRAFT TURBINE ENGINE COMPONENT TESTING**

R. L. SUMMERS and R. C. ANDERSON Jan. 1985 28 p refs  
(NASA-TP-2424; E-2302; NAS 1.60:2424) Avail: NTIS HC A03/MF A01 CSCL 14B

ENGINE TESTS, EXHAUST GASES, GAS ANALYSIS, GAS TURBINE ENGINES

**N86-11437\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **WIND TUNNEL SEEDING SYSTEMS FOR LASER VELOCIMETERS**

W. W. HUNTER, JR., comp. and C. E. NICHOLS, JR., comp. Washington Oct. 1985 264 p refs Workshop held in Hampton, Va., 19-20 Mar. 1985

(NASA-CP-2393; L-16013; NAS 1.55:2393) Avail: NTIS HC A12/MF A01 CSCL 14B

FLOW DISTRIBUTION, LASER DOPPLER VELOCIMETERS, PARTICLE DENSITY (CONCENTRATION), PARTICLE SIZE DISTRIBUTION, SCATTERING, WIND TUNNELS

**N86-12579\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **RAPID ESTIMATION OF FREQUENCY RESPONSE FUNCTIONS BY CLOSE-RANGE PHOTOGRAMMETRY**

J. S. TRIPP Nov. 1985 30 p refs  
(NASA-TP-2471; L-15955; NAS 1.60:2471) Avail: NTIS HC A03/MF A01 CSCL 14E

DYNAMIC RESPONSE, PERTURBATION THEORY, PHOTOGRAMMETRY, RAMP FUNCTIONS, STEREOPHOTOGRAPHY



**N86-20753\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NEW METHOD FOR DETERMINING HEATS OF COMBUSTION OF GASEOUS HYDROCARBONS**

J. J. SINGH, D. R. SPRINKLE, and R. L. PUSTER Dec. 1985 13 p refs

(NASA-TP-2531; L-16054; NAS 1.60:2531) Avail: NTIS HC A02/MF A01 CSCL 14B

CALORIMETERS, HEAT OF COMBUSTION, NATURAL GAS, ON-LINE SYSTEMS

**N86-24962\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MEASUREMENT OF VISCOSITY OF GASEOUS MIXTURES AT ATMOSPHERIC PRESSURE**

J. J. SINGH, G. H. MALL (Computer Sciences Corp., Hampton, Va), and H. CHEGINI (Old Dominion Univ.) May 1986 19 p refs

(NASA-TP-2582; L-16103; NAS 1.60:2582) Avail: NTIS HC A02/MF A01 CSCL 14B

CAPILLARY FLOW, CHAPMAN-ENSKOG THEORY, COEFFICIENTS, GAS MIXTURES, LAMINAR FLOW, NATURAL GAS, VISCOSITY

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## LASERS AND MASERS

Includes parametric amplifiers.

**N78-16354\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PRELAUNCH TESTING OF THE GEOS-3 LASER REFLECTOR ARRAY**

P. O. MINOTT, M. W. FITZMAURICE, J. B. ABSHIRE, and H. E. ROWE Jan. 1978 53 p refs

(NASA-TP-1138; G-7702-F19) Avail: NTIS HC A04/MF A01 CSCL 20E

GEOS 3 SATELLITE, PULSED LASERS, REFLECTORS

**N78-31413\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**A COMPARATIVE STUDY OF OPTIMUM AND SUBOPTIMUM DIRECT-DETECTION LASER RANGING RECEIVERS**

J. B. ABSHIRE Sep. 1978 43 p refs

(NASA-TP-1315; G-7802-F15) Avail: NTIS HC A03/MF A01 CSCL 20E

LASER RANGE FINDERS, OPTICAL RADAR, RECEIVERS

**N79-22455\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**LASER DOPPLER VELOCIMETRY WORKSHOP**

R. B. OWEN Mar. 1979 12 p Workshop held at Huntsville, Ala., 12 Feb. 1979

(NASA-CP-2084) Avail: NTIS HC A02/MF A01 CSCL 20E

DOPPLER EFFECT, LASER APPLICATIONS, LASER DOPPLER VELOCIMETERS, VELOCITY MEASUREMENT

**N80-11414\*#** National Aeronautics and Space Administration, Washington, D.C.

**SHUTTLE ATMOSPHERIC LIDAR RESEARCH PROGRAM Final Report**

1979 231 p

(NASA-SP-433) Avail: NTIS HC A11/MF A01 CSCL 20E

The Shuttle atmospheric lidar program is discussed in relation to an understanding of the processes governing the Earth's atmosphere and in the capacity to evaluate the atmospheric susceptibility to manmade and natural perturbations. Applications of the lidar which are discussed are the determination of the global flow of water vapor and pollutants in the troposphere,

improvement of chemical and transport models of the stratosphere and mesosphere, evaluation of radiative models of the atmosphere, investigation of chemistry and transport of thermospheric atomic species, and investigation of magnetospheric aspects of sun/weather relationships. The features of the lidar measurements discussed are the high spatial resolution, control of the source wavelength and intensity, and high measurement specificity. For individual titles, see N80-11415 through N80-11428.

**N80-13438\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NUCLEAR-PUMPED LASERS**

Dec. 1979 140 p refs Proc. of Workshop held at Hampton, Va., 25-26 Jul. 1979

(NASA-CP-2107; L-13366) Avail: NTIS HC A07/MF A01 CSCL 20E

COHERENT RADIATION, CONFERENCES, ENERGY CONVERSION EFFICIENCY, NUCLEAR PUMPED LASERS, NUCLEAR REACTIONS

**N80-29652\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HETERODYNE SYSTEMS AND TECHNOLOGY, PART 1**

Aug. 1980 266 p refs Intern. Conf. held at Williamsburg, Va., 25-27 Mar. 1980 2 Vol.

(NASA-CP-2138-PT-1) Avail: NTIS HC A12/MF A01 CSCL 20E

CONFERENCES, DIODES, INFRARED DETECTORS, OPTICAL HETERODYNING, TUNABLE LASERS

**N80-29672\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HETERODYNE SYSTEMS AND TECHNOLOGY, PART 2**

Aug. 1980 321 p refs Conf. held in Williamsburg, Va., 25-27 Mar. 1980

(NASA-CP-2138-PT-2) Avail: NTIS HC A14/MF A01 CSCL 20E

INFRARED SPECTROSCOPY, OPTICAL HETERODYNING, SEMICONDUCTOR DEVICES

**N81-27467\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PROCEEDINGS OF THE 12TH ANNUAL PRECISE TIME AND TIME INTERVAL (PTTI) APPLICATIONS AND PLANNING MEETING**

S. C. WARDRIIP, ed. Mar. 1981 871 p refs Meeting held at Greenbelt, Md., 2-4 Dec. 1980 Sponsored in cooperation with Navy, NBS and Defense Communications Agency

(NASA-CP-2175; REPT-814.2) Avail: NTIS HC A99/MF A01 CSCL 14D

CONFERENCES, FREQUENCY STANDARDS, HYDROGEN MASERS, RELIABILITY ENGINEERING, SYNCHRONISM, TIME MEASUREMENT

**N82-12431\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXCESS NOISE IN TUNABLE DIODE LASERS**

C. W. ROWLAND Nov. 1981 16 p refs

(NASA-TP-1935; L-14453) Avail: NTIS HC A02/MF A01 CSCL 20E

OPTICAL HETERODYNING, PHOTODIODES, SEMICONDUCTOR LASERS, SIGNAL TO NOISE RATIOS, TUNABLE LASERS

**N82-18578\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SPACE LASER POWER TRANSMISSION SYSTEM STUDIES**

M. D. WILLIAMS, ed. and E. J. CONWAY, ed. Feb. 1982 210 p refs Symp. held in Hampton, Va., 14-15 Oct. 1981

(NASA-CP-2214; L-15030) Avail: NTIS HC A10/MF A01 CSCL 20E

CONFERENCES, LASER APPLICATIONS, POWER TRANSMISSION (LASERS), SATELLITE POWER TRANSMISSION (TO EARTH), SPACE PLATFORMS

**N82-20494\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PROCEEDINGS OF THE THIRTEENTH ANNUAL PRECISE TIME AND TIME INTERVAL (PTTI) APPLICATIONS AND PLANNING MEETING**

S. C. WARDRIP Mar. 1982 864 p refs Meeting held at Washington, D.C., 1-3 Dec. 1981; sponsored by the Naval Observatory, NASA. Goddard Space Flight Center, Naval Electronic Systems Command, NRL, Defense Communications Agency, Chief of Naval Operations, NBS, Army Electronics Technology and Devices Lab., RADDC (NASA-CP-2220; NAS 1.55:2220) Avail: NTIS HC A99/MF A01 CSCL 20E

ATOMIC CLOCKS, COMPONENT RELIABILITY, GLOBAL POSITIONING SYSTEM, HYDROGEN MASERS, NAVIGATION SATELLITES, TIME MEASUREMENT

**N83-16738\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DIRECT NUCLEAR-POWERED LASERS**

N. W. JALUFKA Jan. 1983 53 p refs (NASA-TP-2091; L-15168; NAS 1.60:2091) Avail: NTIS HC A04/MF A01 CSCL 20E

FISSIONABLE MATERIALS, HELIUM ISOTOPES, LASER PUMPING, NEUTRON SOURCES, NUCLEAR FISSION

**N83-27200\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A NASA HIGH-POWER SPACE-BASED LASER RESEARCH AND APPLICATIONS PROGRAM**

R. J. DEYOUNG, G. D. WALBERG, E. J. CONWAY, and L. W. JONES May 1983 46 p refs (NASA-SP-464; NAS 1.21:464; LC-83-600161) Avail: NTIS HC A03/MF A01 CSCL 20E

Applications of high power lasers are discussed which might fulfill the needs of NASA missions, and the technology characteristics of laser research programs are outlined. The status of the NASA programs or lasers, laser receivers, and laser propulsion is discussed, and recommendations are presented for a proposed expanded NASA program in these areas. Program elements that are critical are discussed in detail. S.L.

**N83-32044\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SOLAR-SIMULATOR-PUMPED ATOMIC IODINE LASER KINETICS**

H. W. WILSON, S. RAJU, and Y. J. SHIU Aug. 1983 17 p refs (NASA-TP-2182; L-15615; NAS 1.60:2182) Avail: NTIS HC A02/MF A01 CSCL 20E

ENERGY CONVERSION, IODINE LASERS, KINETICS, LASER PUMPING, PHOTOCHEMICAL REACTIONS, SOLAR SIMULATORS

**N83-35351\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PROCEEDINGS OF THE 14TH ANNUAL PRECISE TIME AND TIME INTERVAL (PTTI) APPLICATIONS PLANNING MEETING**

S. C. WARDRIP, ed. Feb. 1983 622 p refs Meeting held in Greenbelt, Md., 30 Nov. - 2 Dec. 1982; sponsored in cooperation with Naval Observatory, Naval Electronic Systems Command, NRL, Defense Communications Agency, Chief of Naval Operations, NBS, Army Electronics Technology and Devices Lab., and RADDC (NASA-CP-2265; NAS 1.55:2265) Avail: NTIS HC A99/MF A01 CSCL 20E

ATOMIC CLOCKS, FREQUENCY STANDARDS, HYDROGEN MASERS, RESONATORS, SYNCHRONISM, TIME MEASUREMENT, TIME SIGNALS

**N84-17575\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THRESHOLD KINETICS OF A SOLAR-SIMULATOR-PUMPED IODINE LASER**

J. W. WILSON, Y. LEE (Hampton Inst.), W. R. WEAVER, D. H. HUMES, and J. H. LEE (Vanderbilt Univ.) Feb. 1984 43 p refs (NGT-47-020-801; NCC1-8)

(NASA-TP-2241; L-15684; NAS 1.60:2241) Avail: NTIS HC A03/MF A01 CSCL 20E

IODINE LASERS, LASER OUTPUTS, LASER PUMPING, REACTION KINETICS, SOLAR SIMULATORS

**N84-23878\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTENSITY AND ABSORBED-POWER DISTRIBUTION IN A CYLINDRICAL SOLAR-PUMPED DYE LASER**

M. D. WILLIAMS 1984 18 p refs (NASA-TP-2321; L-15694; NAS 1.60:2321) Avail: NTIS HC A02/MF A01 CSCL 20E

ABSORPTIVITY, DYE LASERS, ENERGY ABSORPTION, LASER PUMPING, SOLAR ENERGY, SUNLIGHT

**N84-31617\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A BLACKBODY-PUMPED CO<sub>2</sub>-N<sub>2</sub> TRANSFER LASER**

R. J. DEYOUNG and N. S. HIGDON Aug. 1984 12 p refs (NASA-TP-2347; L-15753; NAS 1.60:2347) Avail: NTIS HC A02/MF A01 CSCL 20E

BLACK BODY RADIATION, CARBON DIOXIDE LASERS, LASER OUTPUTS, LASER PUMPING, NITROGEN LASERS, SOLAR-PUMPED LASERS

**N86-16563\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PERFORMANCE TEST OF LASER VELOCIMETER SYSTEM FOR THE LANGLEY 16-FOOT TRANSONIC TUNNEL**

J. F. MEYERS, W. W. HUNTER, JR., D. E. REUBUSH, C. E. NICHOLS, JR., T. E. HEPNER (Army Aviation Systems Command, Hampton, Va.), and J. W. LEE Dec. 1985 38 p refs (DA PROJ. 1L1-61102-AH-45)

(NASA-TP-2502; L-15940; NAS 1.60:2502; AVSCOM-TR-85-B-4) Avail: NTIS HC A03/MF A01 CSCL 20E

FREE FLOW, LASER DOPPLER VELOCIMETERS, PARTICLE SIZE DISTRIBUTION, TRANSONIC FLOW

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## MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

**N77-31502\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EXPERIMENTAL EVALUATION OF FOIL-SUPPORTED RESILIENT-PAD GAS-LUBRICATED THRUST BEARING**

Z. N. NEMETH Sep. 1977 20 p refs (NASA-TP-1030; E-9061) Avail: NTIS HC A02/MF A01 CSCL 131

FOIL BEARINGS, GAS LUBRICANTS, PERFORMANCE TESTS, THRUST BEARINGS

**N77-33520\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF DOUBLE VACUUM MELTING AND RETAINED AUSTENITE ON ROLLING-ELEMENT FATIGUE LIFE OF AMS 5749 BEARING STEEL**

R. J. PARKER and R. S. HODDER (Latrobe Steel Co., Latrobe, Pa.) Oct. 1977 16 p refs

(NASA-TP-1060; E-9101) Avail: NTIS HC A02/MF A01 CSCL 11F

AUSTENITE, BEARING ALLOYS, STEELS, VACUUM MELTING

**N78-10474\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**STABILITY OF NUMERICAL INTEGRATION TECHNIQUES FOR TRANSIENT ROTOR DYNAMICS**

A. F. KASCAK 1977 22 p refs

(NASA-TP-1092; E-9252) Avail: NTIS HC A02/MF A01 CSCL 21E

NUMERICAL INTEGRATION, NUMERICAL STABILITY, ROTATING SHAFTS, ROTORS, TRANSIENT RESPONSE

**N78-18429\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**STATISTICAL MODEL FOR ASPERITY-CONTACT TIME FRACTION IN ELASTOHYDRODYNAMIC LUBRICATION**

S. M. SIDIK and J. J. COY (US Army R and T Labs., Cleveland) Feb. 1978 41 p refs

(NASA-TP-1130; E-9265) Avail: NTIS HC A03/MF A01 CSCL 13I

BALL BEARINGS, ELASTOHYDRODYNAMICS, LUBRICATION, STATISTICAL ANALYSIS

**N78-20512\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR OF SELECTED METALS AND ALLOYS IN SLIDING CONTACT WITH AISI 440 C STAINLESS STEEL IN LIQUID METHANE AND IN LIQUID NATURAL GAS**

D. W. WISANDER Feb. 1978 18 p refs

(NASA-TP-1150; E-9195) Avail: NTIS HC A02/MF A01 CSCL 20K

ALUMINUM, BERYLLIUM, COPPER, COPPER ALLOYS, IRON, NICKEL, SLIDING FRICTION, TITANIUM, WEAR

**N78-20513\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PREDICTED AND EXPERIMENTAL PERFORMANCE OF JET-LUBRICATED 120-MILLIMETER-BORE BALL BEARINGS OPERATING TO 2.5 MILLION DN**

H. H. COE and E. V. ZARETSKY Apr. 1978 28 p refs

(NASA-TP-1196; E-9288) Avail: NTIS HC A03/MF A01 CSCL 13I

BALL BEARINGS, COMPUTER PROGRAMS, LUBRICATION SYSTEMS, PREDICTION ANALYSIS TECHNIQUES

**N78-21470\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CHARACTERIZATION OF WEAR DEBRIS GENERATED IN ACCELERATED ROLLING-ELEMENT FATIGUE TESTS**

W. R. JONES, JR. and R. J. PARKER Apr. 1978 28 p refs

(NASA-TP-1203; E-9260) Avail: NTIS HC A03/MF A01 CSCL 13I

BALLS, CORROSION RESISTANCE, FATIGUE TESTS, FERROMAGNETISM, MINERAL OILS

**N78-21473\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROLLING-ELEMENT FATIGUE LIFE OF AISI M-50 AND 18-4-1 BALLS**

R. J. PARKER and E. V. ZARETSKY Apr. 1978 19 p refs

(NASA-TP-1202; E-9350) Avail: NTIS HC A02/MF A01 CSCL 13I

BALL BEARINGS, FATIGUE LIFE, FATIGUE TESTS, SHAFTS (MACHINE ELEMENTS)

**N78-22377\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FERROGRAPHIC ANALYSIS OF WEAR PARTICLES FROM SLIDING ELASTOHYDRODYNAMIC EXPERIMENTS**

W. R. JONES, JR., H. S. NAGARAJ (Mechanical Technology, Inc., Latham, N. Y.), and W. O. WINER (Georgia Inst. of Tech., Atlanta) Apr. 1978 31 p refs

(NASA-TP-1230; E-9300) Avail: NTIS HC A03/MF A01 CSCL 20K

ELASTOHYDRODYNAMICS, FERROMAGNETISM, GRANULAR MATERIALS, STRUCTURAL ANALYSIS, WEAR

**N78-25433\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SOME EFFECTS OF COMPOSITION ON FRICTION AND WEAR OF GRAPHITE-FIBER-REINFORCED POLYIMIDE LINERS IN PLAIN SPHERICAL BEARINGS**

H. E. SLINEY and T. P. JACOBSON May 1978 23 p refs

(NASA-TP-1229; E-9296) Avail: NTIS HC A02/MF A01 CSCL 13I

BALL BEARINGS, COMPOSITE MATERIALS, FRICTION MEASUREMENT, GRAPHITE, POLYIMIDES, REINFORCING FIBERS, WEAR TESTS

**N78-28457\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF FILTRATION ON ROLLING-ELEMENT-BEARING LIFE IN CONTAMINATED LUBRICANT ENVIRONMENT**

S. H. LOEWENTHAL, D. W. MOYER (Tribon Bearing Co., Cleveland), and J. J. SHERLOCK (Tribon Bearing Co., Cleveland) Jul. 1978 34 p refs

(NASA-TP-1272; E-9418) Avail: NTIS HC A03/MF A01 CSCL 13I

FATIGUE LIFE, FILTRATION, ROLLER BEARINGS

**N78-28458\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ELASTOHYDRODYNAMIC LUBRICATION OF ELLIPTICAL CONTACTS FOR MATERIALS OF LOW ELASTIC MODULUS. 2: STARVED CONJUNCTION**

B. J. HAMROCK and D. DOWSON (Leeds Univ., England) Jul. 1978 26 p refs Proposed for presentation at the Joint Lubrication Conf., Minneapolis, 24-26 Oct. 1978; sponsored by the Am. Soc. of Lubrication Engr. and the Am. Soc. of Mech. Engr.

(NASA-TP-1273; E-9558) Avail: NTIS HC A03/MF A01 CSCL 11H

CONTACT RESISTANCE, FILM THICKNESS, LUBRICANTS, PRESSURE DISTRIBUTION

**N78-30585\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF GEOMETRY ON HYDRODYNAMIC FILM THICKNESS**

D. E. BREWE (AVRADCOR Res. and Technol. Labs.), B. J. HAMROCK, and C. M. TAYLOR (Leeds Univ., England) Aug. 1978 36 p refs Proposed for presentation at ASLE-ASME Joint Lubrication Conf., Minneapolis, 24-26 Oct. 1978

(NASA-TP-1287; E-9347; AVRADCOR-TR-78-18) Avail: NTIS HC A03/MF A01 CSCL 20K

BEARINGS, FILM THICKNESS, HYDRODYNAMICS, ISOTHERMAL PROCESSES

**N78-33447\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MINIMUM FILM THICKNESS IN ELLIPTICAL CONTACTS FOR DIFFERENT REGIMES OF FLUID-FILM LUBRICATION**

B. J. HAMROCK and D. DOWSON (Leeds Univ., Engl.) Oct. 1978 25 p refs

(NASA-TP-1342; E-9687) Avail: NTIS HC A02/MF A01 CSCL 11H

ELASTOHYDRODYNAMICS, FILM THICKNESS, FLUID FILMS, LUBRICATION

## 37 MECHANICAL ENGINEERING

**N79-10424\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPRESSIBLE FLOW ACROSS NARROW PASSAGES: COMPARISON OF THEORY AND EXPERIMENT FOR FACE SEALS**

G. P. ALLEN, D. W. WISANDER, and W. F. HADY Nov. 1978 19 p refs  
(NASA-TP-1346; E-9120) Avail: NTIS HC A02/MF A01 CSCL 11A

COMPRESSIBLE FLOW, FLUID FLOW, LEAKAGE, SEALS (STOPPERS)

**N79-10425\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANISOTROPIC FRICTION AND WEAR OF SINGLE-CRYSTAL MANGANESE-ZINC FERRITE IN CONTACT WITH ITSELF**

K. MIYOSHI (Kanazawa Univ., Japan) and D. H. BUCKLEY Oct. 1978 23 p refs  
(NASA-TP-1339; E-9673) Avail: NTIS HC A02/MF A01 CSCL 20L

ANISOTROPY, COEFFICIENT OF FRICTION, FERRITES, MANGANESE ALLOYS, SINGLE CRYSTALS, ZINC ALLOYS

**N79-13369\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF A NASVYTIS MULTIROLLER TRACTION DRIVE**

S. H. LOEWENTHAL, N. E. ANDERSON (AVRADCOM Res. and Technol. Labs.), and A. L. NASVYTIS (Transmission Res., Inc.) Nov. 1978 36 p refs  
(NASA-TP-1378; E-9632; AVRADCOM-TR-78-36) Avail: NTIS HC A03/MF A01 CSCL 13I

MECHANICAL DRIVES, TRACTION

**N79-14386\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND TRANSFER OF COPPER, SILVER, AND GOLD TO IRON IN THE PRESENCE OF VARIOUS ADSORBED SURFACE FILMS**

D. H. BUCKLEY Jan. 1979 19 p refs  
(NASA-TP-1392; E-9684) Avail: NTIS HC A02/MF A01 CSCL 20K

ELECTRON TRANSITIONS, IRON, METAL SURFACES, NOBLE METALS, SLIDING FRICTION

**N79-14387\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR CHARACTERISTICS OF IRON-CHROMIUM ALLOYS IN CONTACT WITH THEMSELVES AND SILICON CARBIDE**

K. MIYOSHI and D. H. BUCKLEY Jan. 1979 23 p refs  
(NASA-TP-1387; E-9670) Avail: NTIS HC A02/MF A01 CSCL 20K

CHROMIUM ALLOYS, IRON ALLOYS, SLIDING FRICTION, WEAR

**N79-14389\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EVALUATION OF CBS 600 CARBURIZED STEEL AS A GEAR MATERIAL**

D. P. TOWNSEND, R. J. PARKER, and E. V. ZARETSKY Jan. 1979 27 p refs  
(NASA-TP-1390; E-9651) Avail: NTIS HC A03/MF A01 CSCL 13I

CARBURIZING, FATIGUE (MATERIALS), GEARS, STEELS

**N79-17227\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRICTION AND WEAR WITH A SINGLE-CRYSTAL ABRASIVE GRIT OF SILICON CARBIDE IN CONTACT WITH IRON BASE BINARY ALLOYS IN OIL: EFFECTS OF ALLOYING ELEMENT AND ITS CONTENT**

K. MIYOSHI (Kanazawa Univ., Japan) and D. H. BUCKLEY Feb. 1979 19 p  
(NASA-TP-1394; E-9765) Avail: NTIS HC A02/MF A01 CSCL 20K

ABRASION, IRON ALLOYS, SILICON CARBIDES, SLIDING FRICTION, SURFACE PROPERTIES, WEAR TESTS

**N79-18323\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**OPERATING CHARACTERISTICS OF A LARGE-BORE ROLLER BEARING TO SPEEDS OF 3 TIMES 10 TO THE 6TH POWER DN**

F. T. SCHULLER Feb. 1979 32 p refs  
(NASA-TP-1413; E-9657) Avail: NTIS HC A03/MF A01 CSCL 13I

ROLLER BEARINGS, ROLLING CONTACT LOADS

**N79-21352\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**THE 12TH AEROSPACE MECHANISMS SYMPOSIUM**

Apr. 1979 241 p refs Symp. held at Moffett Field, Calif., 27-28 Apr. 1978; sponsored in part by NASA, Calif. Inst. of Tech. and Lockheed  
(NASA-CP-2080; A-7737) Avail: NTIS HC A11/MF A01 CSCL 20K

AEROSPACE ENGINEERING, CONFERENCES, MECHANICAL DEVICES, MECHANICAL ENGINEERING

**N79-21374\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE 11TH AEROSPACE MECHANISMS SYMPOSIUM**

28 Apr. 1977 243 p refs Symp. held at Greenbelt, Md., 28-29 Apr. 1977; Sponsored by NASA, LMSC, and Calif. Inst. of Technol.  
(NASA-CP-2038) Avail: NTIS HC A11/MF A01 CSCL 20K

AEROSPACE ENGINEERING, CONFERENCES

**N79-22518\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**OPERATING CHARACTERISTICS OF A CANTILEVER-MOUNTED RESILIENT-PAD GAS-LUBRICATED THRUST BEARING**

Z. N. NEMETH Washington Apr. 1979 30 p refs  
(NASA-TP-1438; E-9815) Avail: NTIS HC A03/MF A01 CSCL 13I

CANTILEVER BEAMS, GAS BEARINGS, THRUST BEARINGS

**N79-22519\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPARISON OF ANALYSIS AND EXPERIMENT FOR SELF-ACTING SEALS FOR LIQUID-OXYGEN TURBOPUMPS**

G. P. ALLEN Apr. 1979 15 p refs  
(NASA-TP-1443; E-9806) Avail: NTIS HC A02/MF A01 CSCL 13I

LIQUID OXYGEN, SEALS (STOPPERS), TURBINE PUMPS

**N79-31604\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EVALUATION OF HIGH-CONTACT-RATIO SPUR GEARS WITH PROFILE MODIFICATION**

D. P. TOWNSEND, B. B. BABER (Southwest Research Inst., San Antonio, Tex.), and A. NAGY (Southwest Research Inst., San Antonio, Tex.) Sep. 1979 24 p refs  
(NASA-TP-1458; E-9949) Avail: NTIS HC A02/MF A01 CSCL 13I

CONTACT POTENTIALS, FATIGUE TESTS, GEAR TEETH, GEARS, SURFACE PROPERTIES

**N79-31605\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FERROGRAPHIC ANALYSIS OF WEAR DEBRIS FROM FULL-SCALE BEARING FATIGUE TESTS**

W. R. JONES, JR. and S. H. LOEWENTHAL Sep. 1979 19 p refs  
(NASA-TP-1511; E-9827) Avail: NTIS HC A02/MF A01 CSCL 131

BALL BEARINGS, FATIGUE TESTS, WEAR

**N79-32552\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPARISON OF PREDICTED AND MEASURED ELASTOHYDRODYNAMIC FILM THICKNESS IN A 20-MILLIMETER-BORE BALL BEARING**

J. J. COY, R. S. R. GORLA (Cleveland State Univ., Ohio), and D. P. TOWNSEND Oct. 1979 29 p refs  
(NASA-TP-1542; AVRADCOM-TR-79-20; E-9992) Avail: NTIS HC A03/MF A01 CSCL 131

BALL BEARINGS, ELASTOHYDRODYNAMICS, FILM THICKNESS, LUBRICATION

**N79-33475\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TRACTION DRIVE PERFORMANCE PREDICTION FOR THE JOHNSON AND TEVAARWERK TRACTION MODEL**

J. L. TEVAARWERK Washington Oct. 1979 41 p refs  
(NASA-TP-1530; E-033) Avail: NTIS HC A03/MF A01 CSCL 131

MECHANICAL DRIVES, PERFORMANCE PREDICTION, RHEOLOGY, TRACTION

**N79-33476\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CORRELATION OF ASPERITY CONTACT-TIME FRACTION WITH ELASTOHYDRODYNAMIC FILM THICKNESS IN A 20-MILLIMETER-BORE BALL BEARING**

J. J. COY Washington Oct. 1979 21 p refs  
(NASA-TP-1547; AVRADCOM-TR-79-26) Avail: NTIS HC A02/MF A01 CSCL 131

BALL BEARINGS, ELASTOHYDRODYNAMICS, FILM THICKNESS, LUBRICATION

**N80-14403\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SELF-ACTING LIFT-PAD GEOMETRY FOR CIRCUMFERENTIAL SEALS: A NONCONTACTING CONCEPT**

G. P. ALLEN Jan. 1980 11 p refs  
(NASA-TP-1583; E-154) Avail: NTIS HC A02/MF A01 CSCL 11A

HYDRODYNAMICS, PERFORMANCE TESTS, SEALS (STOPPERS)

**N80-15410\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPARISON OF PREDICTED AND EXPERIMENTAL PERFORMANCE OF LARGE-BORE ROLLER BEARING OPERATING TO 3.0 MILLION DN**

H. H. COE and F. T. HULLER Jan. 1980 20 p refs  
(NASA-TP-1599; E-063) Avail: NTIS HC A02/MF A01 CSCL 131

HEAT TRANSFER, HIGH SPEED, LUBRICATION SYSTEMS, PERFORMANCE PREDICTION, ROLLER BEARINGS

**N80-17466\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SPUR-GEAR-SYSTEM EFFICIENCY AT PART AND FULL LOAD**

N. E. ANDERSON and S. H. LOEWENTHAL Feb. 1980 42 p refs Prepared in cooperation with Army Aviation Res. and Develop. Command, Cleveland  
(NASA-TP-1622; AVRADCOM-TR-79-46; E-061) Avail: NTIS HC A03/MF A01 CSCL 131

GEAR TEETH, GEARS, ROLLING CONTACT LOADS

**N80-19495\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DAMPING IN TAPERED ANNULAR SEALS FOR AN INCOMPRESSIBLE FLUID**

D. P. FLEMING Apr. 1980 22 p refs  
(NASA-TP-1646; E-124) Avail: NTIS HC A02/MF A01 CSCL 11A

DAMPING, DYNAMIC RESPONSE, INCOMPRESSIBLE FLUIDS, O RING SEALS

**N80-21753\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**OPERATING CHARACTERISTICS OF HIGH-SPEED, JET-LUBRICATED 35-MILLIMETER-BORE BALL BEARING WITH A SINGLE-OUTER-LAND-GUIDED CAGE**

F. T. SCHULLER, S. I. PINEL (Industrial Tectonics, Inc.), and H. R. SIGNER (Industrial Tectonics, Inc.) Washington Apr. 1980 16 p refs

(NASA-TP-1657; E-220) Avail: NTIS HC A02/MF A01 CSCL 131

BALL BEARINGS, GAS TURBINE ENGINES, LUBRICATION, SHAFTS (MACHINE ELEMENTS)

**N80-27694\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**RELEASE MECHANISM FOR RELEASING AND REATTACHING EXPERIMENTS ON THE SPACE SHUTTLE**

A. V. CLARK Jul. 1980 21 p  
(NASA-TP-1702; M-301) Avail: NTIS HC A02/MF A01 CSCL 22B

LATCHES, MECHANICAL DRIVES, POSITIONING DEVICES (MACHINERY), RELEASING, REMOTE CONTROL, SPACE SHUTTLE PAYLOADS

**N80-29706\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROTORDYNAMIC INSTABILITY PROBLEMS IN HIGH-PERFORMANCE TURBOMACHINERY**

1980 463 p refs Conf. held at College Station, 12-14 May 1980; sponsored by Texas A and M Univ., Louisville Univ., and AROD

(NASA-CP-2133; E-413) Avail: NTIS HC A20/MF A01 CSCL 131

CONFERENCES, ROTARY STABILITY, TURBOMACHINERY

**N80-29734\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LUBRICATION OF OPTIMIZED-DESIGN TAPERED-ROLLER BEARINGS TO 2.4 MILLION DN**

R. J. PARKER, S. I. PINEL, and HANS R. SIGNER Aug. 1980 18 p refs Sponsored in part by Industrial Tectonics, Inc., Compton, Calif.

(NASA-TP-1714; E-270) Avail: NTIS HC A02/MF A01 CSCL 131

COMPUTER AIDED DESIGN, FLOW VELOCITY, HIGH SPEED, LUBRICATION, ROLLER BEARINGS, TAPERING

**N80-33749\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF CAGE DESIGN ON CHARACTERISTICS OF HIGH-SPEED-JET-LUBRICATED 35-MILLIMETER-BORE BALL BEARING**

F. T. SCHULLER, S. I. PINEL (Industrial Tectonics, Compton, Calif.), and H. R. SIGNER (Industrial Tectonics, Compton, Calif.) Oct. 1980 13 p refs

(NASA-TP-1732; E-289) Avail: NTIS HC A02/MF A01 CSCL 131

BALL BEARINGS, HIGH SPEED, LUBRICATION, ROLLER BEARINGS, SHAFTS (MACHINE ELEMENTS), TURBOJET ENGINES

## 37 MECHANICAL ENGINEERING

**N81-14322\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPARISONS OF MODIFIED VASCO X-2 AND AISI 9310 GEAR STEELS**

D. P. TOWNSEND and E. V. ZARETSKY Nov. 1980 19 p refs  
(NASA-TP-1731; E-070) Avail: NTIS HC A02/MF A01 CSCL 13I

FATIGUE (MATERIALS), GEARS, HARDNESS TESTS, TRANSMISSIONS (MACHINE ELEMENTS), VACUUM MELTING

**N81-19458\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PERFORMANCE OF JET- AND INNER-RING-LUBRICATED 35 MILLIMETER BORE BALL BEARINGS OPERATING TO 2.5 MILLION DN**

F. SCHULLER, T. and H. R. SIGNER Feb. 1981 15 p refs  
(NASA-TP-1808; E-515) Avail: NTIS HC A02/MF A01 CSCL 13I

BALL BEARINGS, COOLING, LUBRICATION, PERFORMANCE TESTS

**N81-20423\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LIFE ANALYSIS OF MULTIROLLER PLANETARY TRACTION DRIVE**

J. J. COY (Army Aviation Research and Development Command, Cleveland, Ohio), D. A. ROHN, and S. H. LOEWENTHAL Apr. 1981 16 p refs Prepared in cooperation with Army Aviation Research and Development Command, Cleveland  
(NASA-TP-1710; AVRADCOM-TR-80-C-16; E-484) Avail: NTIS HC A02/MF A01 CSCL 13I

BALL BEARINGS, FATIGUE LIFE, MECHANICAL DRIVES, ROLLER BEARINGS, TRACTION

**N82-25514\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FRictionAL HEATING DUE TO ASPERITY INTERACTION OF ELASTOHYDRODYNAMIC LINE-CONTACT SURFACES**

B. C. MAJUMDAR and B. J. HAMROCK May 1982 23 p refs  
Presented at the ASME-ASLE Joint Lubrication Conf., New Orleans, 5-7 Oct. 1981  
(NASA-TP-1882; E-897; NAS 1.60:1882) Avail: NTIS HC A02/MF A01 CSCL 20K

ELASTOHYDRODYNAMICS, ENERGY DISSIPATION, FRICTION, LUBRICATION, SURFACE ROUGHNESS, TEMPERATURE GRADIENTS

**N82-26678\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MULTIROLLER TRACTION DRIVE SPEED REDUCER: EVALUATION FOR AUTOMOTIVE GAS TURBINE ENGINE**

D. A. ROHN, N. E. ANDERSON, and S. H. LOEWENTHAL Jun. 1982 24 p refs Prepared in cooperation with Army Aviation Research and Development Command, Cleveland, Ohio  
(NASA-TP-2027; E-1002; NAS 1.60:2027; AVRADCOM-TR-81-C-11) Avail: NTIS HC A02/MF A01 CSCL 20A

AUTOMOBILE ENGINES, GAS TURBINE ENGINES, SPEED CONTROL, TRACTION, TRANSMISSIONS (MACHINE ELEMENTS)

**N82-31691\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INFLUENCE OF CORROSIVE SOLUTIONS ON MICROHARDNESS AND CHEMISTRY OF MAGNESIUM OXIDE /001/ SURFACES**

H. ISHIGAKI (Osaka Univ.), K. MIYOSHI, and D. H. BUCKLEY Aug. 1982 11 p refs  
(NASA-TP-2040; E-1035; NAS 1.60:2040) Avail: NTIS HC A02/MF A01 CSCL 20K

CORROSION, MAGNESIUM OXIDES, MICROHARDNESS, SURFACE PROPERTIES

**N82-32736\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF SHOT PEENING ON SURFACE FATIGUE LIFE OF CARBURIZED AND HARDENED AISI 9310 SPUR GEARS**

D. P. TOWNSEND and E. V. ZARETSKY Aug. 1982 14 p refs  
(NASA-TP-2047; E-936; NAS 1.60:2047) Avail: NTIS HC A02/MF A01 CSCL 13I

FATIGUE LIFE, GEAR TEETH, RESIDUAL STRESS, SHOT PEENING

**N82-32737\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**WEAR MECHANISM BASED ON ADHESION**

T. YAMAMOTO and D. H. BUCKLEY Aug. 1982 13 p refs  
(NASA-TP-2037; E-1118; NAS 1.60:2037) Avail: NTIS HC A02/MF A01 CSCL 11A

ADHESION, SLIDING FRICTION, WEAR

**N83-11496\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PLASTIC DEFORMATION AT SURFACE DURING UNLUBRICATED SLIDING**

T. YAMAMOTO (Tokyo Univ.) and D. H. BUCKLEY Oct. 1982 20 p refs  
(NASA-TP-2036; E-1036; NAS 1.60:2036) Avail: NTIS HC A02/MF A01 CSCL 20K

ALUMINUM OXIDES, PLASTIC DEFORMATION, SLIDING, STAINLESS STEELS, WEAR

**N83-13457\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROLLING-ELEMENT FATIGUE LIFE WITH TRACTION FLUIDS AND AUTOMATIC TRANSMISSION FLUID IN A HIGH-SPEED ROLLING-CONTACT RIG**

R. J. PARKER, A. H. NAHM (General Electric Co., Cincinnati), and S. H. LOEWENTHAL Nov. 1982 16 p refs  
(NAS3-20832)  
(NASA-TP-2050; E-1091; NAS 1.60:2050) Avail: NTIS HC A02/MF A01 CSCL 13I

BEARINGS, FATIGUE LIFE, LUBRICANTS, ROLLING CONTACT LOADS, TRACTION, TRANSMISSION FLUIDS

**N83-15629\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROTORDYNAMIC INSTABILITY PROBLEMS IN HIGH-PERFORMANCE TURBOMACHINERY**

Washington Dec. 1982 460 p refs Workshop held in College Station, Tex., 10-12 May 1982; sponsored by Texas A and M Univ. and the Army Research Office  
(NASA-CP-2250; E-1287; NAS 1.55:2250) Avail: NTIS HC A02/MF A01 CSCL 13I

CONTROL THEORY, CRACKS, DYNAMIC CHARACTERISTICS, MECHANICAL PROPERTIES, ROTORS, STABILITY, TURBOMACHINERY, VIBRATION TESTS

**N83-16758\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROLLING-ELEMENT FATIGUE LIFE OF AMS 5900 BALLS**

R. J. PARKER Jan. 1983 13 p refs  
(NASA-TP-2080; E-1190; NAS 1.60:2080) Avail: NTIS HC A02/MF A01 CSCL 13I

BALL BEARINGS, FATIGUE LIFE, FATIGUE TESTS, STAINLESS STEELS

**N83-16759\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ELASTOHYDRODYNAMIC LUBRICATION OF RECTANGULAR CONTACTS**

B. J. HAMROCK and B. O. JACOBSON (Lulea Univ.) Jan. 1983 30 p refs

(NASA-TP-2111; E-1277; NAS 1.60:2111) Avail: NTIS HC A03/MF A01 CSCL 11H

ELASTOHYDRODYNAMICS, ISOTHERMAL PROCESSES, LUBRICATION, RECTANGLES, SLIDING FRICTION

**N83-20119\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ADVANCED POWER TRANSMISSION TECHNOLOGY**

G. K. FISCHER, ed. Jan. 1983 541 p refs Proc. of symp. held in Cleveland, Ohio, 9-11 Jun. 1981 Sponsored in cooperation with Army Aviation Research and Development Command (NASA-CP-2210; E-817; NAS 1.55:2210; AVRADCOM-TR-82-C-16) Avail: NTIS HC A23/MF A01 CSCL 13I

CONFERENCES, ROLLER BEARINGS, TRACTION, TRANSMISSIONS (MACHINE ELEMENTS)

**N83-24862\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**REGRESSION ANALYSIS OF TRACTION CHARACTERISTICS OF TRACTION FLUIDS**

S. H. LOEWENTHAL and D. A. ROHN May 1983 17 p refs (NASA-TP-2154; E-1300; NAS 1.60:2154) Avail: NTIS HC A02/MF A01 CSCL 11H

CORRELATION COEFFICIENTS, ELASTOHYDRODYNAMICS, LUBRICANTS, REGRESSION ANALYSIS, SLIDING, TRACTION

**N83-27214\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROLLING-ELEMENT BEARINGS**

B. J. HAMROCK and W. J. ANDERSON (Bearings and Lubrication, North Olmsted, Ohio) Jun. 1983 61 p refs Submitted for publication

(NASA-RP-1105; E-1440; NAS 1.61:1105) Avail: NTIS HC A04/MF A01 CSCL 13I

Rolling element bearings are a precision, yet simple, machine element of great utility. A brief history of rolling element bearings is reviewed and the type of rolling element bearings, their geometry and kinematics, as well as the materials they are made from and the manufacturing processes they involve are described. Unloaded and unlubricated rolling element bearings, loaded but unlubricated rolling element bearings and loaded and lubricated rolling element bearings are considered. The recognition and understanding of elastohydrodynamic lubrication covered, represents one of the major development in rolling element bearings. S.L.

**N83-28453\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ELASTOHYDRODYNAMIC CONTACTS. EFFECTS OF DENTS AND GROOVES ON TRACTION AND LOCAL FILM THICKNESS**

L. D. WEDEVEN and C. CUSANO (Illinois Univ., Urbana) Jun. 1983 19 p refs

(NASA-TP-2175; E-1333; NAS 1.60:2175) Avail: NTIS HC A02/MF A01 CSCL 11H

ELASTOHYDRODYNAMICS, FILM THICKNESS, GROOVES, SLIDING FRICTION, SURFACE DEFECTS, TRACTION

**N83-33166\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF CARBIDE DISTRIBUTION ON ROLLING-ELEMENT FATIGUE LIFE OF AMS 5749**

R. J. PARKER and E. N. BAMBERGER (GE, Cincinnati) Aug. 1983 14 p refs

(NASA-TP-2189; E-1243; NAS 1.60:2189) Avail: NTIS HC A02/MF A01 CSCL 13I

BEARING ALLOYS, CARBIDES, CORROSION RESISTANCE, FATIGUE LIFE, ROLLER BEARINGS

**N83-35400\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CAVITATION PITTING AND EROSION OF ALUMINUM 6061-T6 IN MINERAL OIL WATER**

B. C. S. RAO (Indian Inst. of Science) and D. H. BUCKLEY Aug. 1983 9 p refs Presented at ASME Cavitation and Polyphase Flow Forum, Houston, Tex., 20-22 Jun. 1983

(NASA-TP-2146; E-1516; NAS 1.60:2146) Avail: NTIS HC A02/MF A01 CSCL 11F

ALUMINUM, CAVITATION, CORROSION, EROSION, METAL-WATER REACTIONS, MINERAL OILS, PITTING

**N84-13577\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MEASUREMENT OF ROLLING FRICTION BY A DAMPED OSCILLATOR**

M. DAYAN and D. H. BUCKLEY Dec. 1983 8 p refs

(NASA-TP-2257; E-1583; NAS 1.60:2257) Avail: NTIS HC A02/MF A01 CSCL 20K

FRICTION MEASUREMENT, OSCILLATION DAMPERS, ROLLING CONTACT LOADS

**N84-17590\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECTS OF DIFFERENT RUB MODELS ON SIMULATED ROTOR DYNAMICS**

A. F. KASCAK and J. J. TOMKO Feb. 1984 12 p refs Presented at the ASME Appl. Mech., Bioeng., and Fluids Eng. Conf., Houston, Tex., 20-22 Jun. 1983 Prepared in cooperation

with Army Research and Technology Labs., Cleveland (NASA-TP-2220; E-1801; NAS 1.60:2220; AFSCOM-TR-83-C-8; AD-A138495) Avail: NTIS HC A02/MF A01 CSCL 13I

ROTARY STABILITY, ROTOR AERODYNAMICS, ROTOR BLADES (TURBOMACHINERY), TRANSIENT RESPONSE

**N84-18653\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MECHANISM OF LUBRICATION BY TRICRESYLPHOSPHATE (TCP)**

O. D. FAUT (Wilkes Coll., Wilkes-Barre, Pa.) and D. H. BUCKLEY Feb. 1984 13 p refs

(NASA-TP-2274; E-1846; NAS 1.60:2274) Avail: NTIS HC A02/MF A01 CSCL 11H

COEFFICIENT OF FRICTION, LUBRICATION, PHOSPHATES, STEELS, TEMPERATURE DEPENDENCE

**N84-18654\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPARISON OF PREDICTED AND EXPERIMENTAL THERMAL PERFORMANCE OF ANGULAR-CONTACT BALL BEARINGS**

R. J. PARKER Feb. 1984 19 p refs

(NASA-TP-2275; E-1751; NAS 1.60:2275) Avail: NTIS HC A02/MF A01 CSCL 13I

BALL BEARINGS, LUBRICANTS, THERMAL STRESSES

## 37 MECHANICAL ENGINEERING

**N84-23891\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TRIBOLOGY IN THE 80'S. VOLUME 1: SESSIONS 1 TO 4**

Apr. 1984 508 p refs Conf. held at NASA, Lewis Research Center, 18-21 Apr. 1983 2 Vol.

(NASA-CP-2300-VOL-1; E-1559; NAS 1.55:2300-VOL-1) Avail:

NTIS HC A22/MF A01 CSCL 11H

ADHESIVE BONDING, FRICTION, METAL-METAL BONDING, PREDICTION ANALYSIS TECHNIQUES, RHEOLOGY, SURFACE PROPERTIES, TRIBOLOGY, WEAR

**N84-25047\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TRIBOLOGY IN THE 80'S. VOLUME 2: SESSIONS 5 - 8**

Aug. 1984 377 p refs Conf. held in Cleveland, 18-21 Apr. 1983 2 Vol.

(NASA-CP-2300-VOL-2; E-1559; NAS 1.55:2300-VOL-2) Avail:

NTIS HC A17/MF A01 CSCL 13I

ADHESION, CONFERENCES, FRICTION, LUBRICATING OILS, MATERIALS SCIENCE, SOLID LUBRICANTS, TRIBOLOGY, WEAR TESTS

**N84-27041\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DESIGN OF POWER-TRANSMITTING SHIFTS**

S. H. LOEWENTHAL Jul. 1984 26 p refs Submitted for publication

(NASA-RP-1123; E-1899; NAS 1.61:1123) Avail: NTIS HC

A03/MF A01 CSCL 13I

Power transmission shafting which is a vital element of all rotating machinery is discussed. Design methods, based on strength considerations for sizing shafts and axles to withstand both steady and fluctuating loads are summarized. The effects of combined bending, torsional, and axial loads are considered along with many application factors that are known to influence the fatigue strength of shafting materials. Methods are presented to account for variable amplitude loading histories and their influence on limited life designs. The influences of shaft rigidity, materials, and vibration on the design are discussed. E.A.K.

**N84-29226\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**OPERATING CHARACTERISTICS OF A THREE-PIECE-INNER-RING LARGE-BORE ROLLER BEARING TO SPEEDS OF 3 MILLION DN**

F. T. SCHULLER Aug. 1984 21 p refs

(NASA-TP-2355; E-1806; NAS 1.60:2355) Avail: NTIS HC

A02/MF A01 CSCL 13I

LUBRICANTS, PERFORMANCE PREDICTION, ROLLER BEARINGS, TEMPERATURE EFFECTS

**N84-31640\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LUBRICATION OF MACHINE ELEMENTS**

B. J. HAMROCK Aug. 1984 92 p refs Submitted for publication

(NASA-RP-1126; E-1949; NAS 1.61:1126) Avail: NTIS HC

A05/MF A01 CSCL 13I

The understanding of hydrodynamic lubrication began with the classical experiments of Tower and Petrov. Reynolds used a reduced form of the Navier-Stokes equations and the continuity equation to generate a second order differential equation for the pressure in the narrow, converging gap of a bearing contact. Such a pressure enables a load to be transmitted between the surfaces with very low friction since the surfaces are completely separated by a film of fluid. In such a situation it is the physical properties of the lubricant, notably the dynamic viscosity, that dictate the behavior of the contact. The understanding of boundary lubrication is normally attributed to Hardy and Doubleday. In boundary lubrication it is the physical and chemical properties of thin films of molecular proportions and the surfaces to which they are attached that determine contact behavior. The lubricant viscosity is not an influential parameter. Research is devoted to a better

understanding and more precise definition of other lubrication regimes between these extremes. One such regime, elastohydrodynamic lubrication, occurs in nonconformal contacts, where the pressures are high and the bearing surfaces deform elastically. In this situation the viscosity of the lubricant may raise considerably, and this further assists the formation of an effective fluid film. The science of these three lubrication regimes (hydrodynamic, elastohydrodynamic, and boundary) are described and the manner in which this science is used in the design of machine elements is examined. M.A.C.

**N84-32824\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMAL ANALYSIS OF A PLANETARY TRANSMISSION WITH SPHERICAL ROLLER BEARINGS OPERATING AFTER COMPLETE LOSS OF OIL**

H. H. COE Sep. 1984 14 p refs

(NASA-TP-2367; E-2008; NAS 1.60:2367) Avail: NTIS HC

A02/MF A01 CSCL 13I

LOSSES, OILS, ROLLER BEARINGS, THERMAL ANALYSIS, TRANSMISSIONS (MACHINE ELEMENTS)

**N84-32825\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CHARACTERIZATION OF EROSION OF METALLIC MATERIALS UNDER CAVITATION ATTACK IN A MINERAL OIL**

B. C. S. RAO (Indian Inst. of Science, Bangalore, India) and D. H. BUCKLEY Sep. 1984 14 p refs

(NASA-TP-2368; E-2049; NAS 1.60:2368) Avail: NTIS HC

A02/MF A01 CSCL 11F

CAVITATION CORROSION, CRYSTAL STRUCTURE, EROSION, METAL CRYSTALS, MINERAL OILS

**N85-13233\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF TWO INNER-RING OIL-FLOW DISTRIBUTION SCHEMES ON THE OPERATING CHARACTERISTICS OF A 35 MILLIMETER BORE BALL BEARING TO 2.5 MILLION DN**

F. T. SCHULLER, S. I. PINEL (Industrial Tectonics, Inc., Rancho Dominguez, Calif.), and H. R. SIGNER (Industrial Tectonics, Inc., Rancho Dominguez, Calif.) Jan. 1985 14 p refs

(NAS3-19779)

(NASA-TP-2404; E-2127; NAS 1.60:2404) Avail: NTIS HC

A02/MF A01 CSCL 13I

BALL BEARINGS, FLOW DISTRIBUTION, HIGH SPEED, LUBRICATING OILS, ROLLER BEARINGS

**N85-13234\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF LUBRICANT EXTREME-PRESSURE ADDITIVES ON SURFACE FATIGUE LIFE OF AISI 9310 SPUR GEARS**

H. W. SCIBBE, D. P. TOWNSEND, and P. R. ARON Dec. 1984 14 p refs

(NASA-TP-2408; E-2042; NAS 1.60:2408) Avail: NTIS HC

A02/MF A01 CSCL 13I

ADDITIVES, FATIGUE LIFE, GEARS, LUBRICANTS, STEELS

**N85-14116\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ROTORDYNAMIC INSTABILITY PROBLEMS IN HIGH-PERFORMANCE TURBOMACHINERY**

Washington Dec. 1984 507 p refs Workshop held in College Station, Tex., 28-30 May 1984; sponsored by Texas A&M Univ., Army Research Office, and the Air Force Aeropropulsion Lab.

(NASA-CP-2338; E-2214; NAS 1.55:2338) Avail: NTIS HC

A22/MF A01 CSCL 13I

CONFERENCES, FLUID POWER, HYDRODYNAMICS, ROTOR AERODYNAMICS, STABILITY, TURBOMACHINERY



**N85-20339\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**APPLICATIONS OF TETHERS IN SPACE, VOLUME 1**

A. C. CRON, comp. (General Research Corp., McLean, Va.) Washington Mar. 1985 283 p refs Workshop held in Williamsburg, Va., 15-17 Jun. 1983 2 Vol.

(NAS8-35403)

(NASA-CP-2364; M-475; NAS 1.55:2364) Avail: NTIS HC

A13/MF A01 CSCL 13I

CONFERENCES, ORBITAL SERVICING, SPACE STATIONS, SPACE TRANSPORTATION, TETHERED SATELLITES, TETHERING

**N85-20361\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**APPLICATIONS OF TETHERS IN SPACE, VOLUME 2**

A. C. CRON, comp. (General Research Corp., McLean, Va.) Washington Mar. 1985 319 p refs Workshop held in Williamsburg, Va., 15-17 Jun. 1983 2 Vol.

(NAS8-35403)

(NASA-CP-2365; M-476; NAS 1.55:2365) Avail: NTIS HC

A14/MF A01 CSCL 13I

CONFERENCES, ELECTRODYNAMICS, ELECTROMAGNETIC INTERACTIONS, PLASMA DIAGNOSTICS, SPACE TRANSPORTATION SYSTEM, TETHERED SATELLITES

**N85-21659\*#** General Research Corp., McLean, Va.

**APPLICATIONS OF TETHERS IN SPACE Executive Summary**

A. C. CRON 1985 69 p Workshop held in Williamsburg, Va., 15-17 Jun. 1983

(NAS8-35408)

(NASA-CP-2366; NAS 1.55:2366) Avail: NTIS HC A04/MF A01

CSCL 22A

TECHNOLOGY UTILIZATION, TETHERED SATELLITES, TETHERLINES

**N85-31511\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF SPEED AND PRESS FIT ON FATIGUE LIFE OF ROLLER-BEARING INNER-RACE CONTACT**

H. H. COE and E. V. ZARETSKY Jul. 1985 13 p refs

(NASA-TP-2496; E-2476; NAS 1.60:2496) Avail: NTIS HC

A02/MF A01 CSCL 13I

FATIGUE LIFE, ROLLER BEARINGS, ROLLING CONTACT LOADS, STRESS ANALYSIS

**N85-32329\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SURFACE ROUGHNESS EFFECTS IN ELASTOHYDRODYNAMIC CONTACTS**

J. H. TRIPP (Case Western Reserve Univ.) and B. J. HAMROCK Jul. 1985 14 p refs Presented at the 11th Leeds-Lyon Symp. on Mixed Lubrication and Lubricated Wear, Leeds, Engl., 4-7 Sep. 1984

(NASA-TP-2488; E-2524; NAS 1.60:2488) Avail: NTIS HC

A02/MF A01 CSCL 20K

ELASTOHYDRODYNAMICS, FRICTION, LUBRICATION, SURFACE ROUGHNESS

**N85-32330\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MECHANICS OF A GASEOUS FILM BARRIER TO LUBRICANT WETTING OF ELASTOHYDRODYNAMICALLY LUBRICATED CONJUNCTIONS**

J. M. PRAHL (Case Western Reserve Univ.) and B. J. HAMROCK Aug. 1985 17 p refs Presented at the 11th Leeds-Lyon Symp. on Mixed Lubrication and Lubricated Wear, Leeds, Engl., 4-7 Sep. 1984

(NCC3-30)

(NASA-TP-2500; E-2523; NAS 1.60:2500) Avail: NTIS HC

A02/MF A01 CSCL 20K

BALL BEARINGS, DYNAMIC MODELS, ELASTOHYDRODY-

NAMICS, GAS DYNAMICS, GAS-LIQUID INTERACTIONS, HYDRODYNAMICS, LUBRICATION, WETTING

**N85-32331\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**HERTZIAN CONTACT IN TWO AND THREE DIMENSIONS**

J. H. TRIPP (Case Western Reserve Univ.) Jul. 1985 27 p refs

(NASA-TP-2473; E-2256; NAS 1.60:2473) Avail: NTIS HC

A03/MF A01 CSCL 20K

ELASTIC DEFORMATION, INTERFACIAL TENSION, STRESS-STRAIN RELATIONSHIPS, TRIBOLOGY

**N86-12609\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SURFACE FATIGUE LIFE AND FAILURE CHARACTERISTICS OF EX-53, CBS 1000M, AND AISI 9310 GEAR MATERIALS**

D. P. TOWNSEND Oct. 1985 14 p refs

(NASA-TP-2513; E-2578; NAS 1.60:2513) Avail: NTIS HC

A02/MF A01 CSCL 13I

AMBIENT TEMPERATURE, FAILURE ANALYSIS, FATIGUE LIFE, FRACTURING, GEAR TEETH, GEARS, LOADS (FORCES), ROLLING CONTACT LOADS, STEELS, SURFACE REACTIONS

**N86-13734\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DESIGN OF TRACTION DRIVES**

S. H. LOEWENTHAL and E. V. ZARETSKY Oct. 1985 49 p refs Submitted for publication

(NASA-RP-1154; E-2143; NAS 1.61:1154) Avail: NTIS HC

A03/MF A01 CSCL 13I

Traction drives are among the simplest of all speed-changing mechanisms. Because of their simplicity and their ability to smoothly and continuously adjust speed, they are excellent choices for many drive system applications. They have been used in industrial service for more than 100 years. Today's traction drives have power capacities which rival the best gear and belt drives due to modern traction fluids and highly fatigue-resistant bearing steels. This report summarizes methods to analyze and size traction drives. Lubrication principles, contact kinematics, stress, fatigue life, and performance prediction methods are presented. The effects of the lubricant's traction characteristics on life and power loss are discussed. An example problem is given which illustrates the effects of spin on power loss. Loading mechanism design and the design of nonlubricated friction wheels and rings are also treated. Author

**N86-14612\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**GEARING**

J. J. COY (Army Aviation Research and Technology Activity, Cleveland, Ohio), D. P. TOWNSEND, and E. V. ZARETSKY Dec. 1985 70 p refs

(NASA-RP-1152; E-2003; NAS 1.61:1152; AVSCOM-TR-84-C-15)

Avail: NTIS HC A04/MF A01 CSCL 13I

Gearing technology in its modern form has a history of only 100 years. However, the earliest form of gearing can probably be traced back to fourth century B.C. Greece. Current gear practice and recent advances in the technology are drawn together. The history of gearing is reviewed briefly in the Introduction. Subsequent sections describe types of gearing and their geometry, processing, and manufacture. Both conventional and more recent methods of determining gear stress and deflections are considered. The subjects of life prediction and lubrication are additions to the literature. New and more complete methods of power loss predictions as well as an optimum design of spur gear meshes are described. Conventional and new types of power transmission systems are presented. Author

## 37 MECHANICAL ENGINEERING

**N86-24992\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**TESTING OF YUH-61A HELICOPTER TRANSMISSION IN NASA LEWIS 2240-KW (3000-HP FACILITY)**  
A. M. MITCHELL, F. B. OSWALD, and F. T. SCHULLER Mar. 1986 28 p refs  
(NASA-TP-2538; E-2801; NAS 1.60:2538) Avail: NTIS HC A03/MF A01 CSCL 01C  
GEARS, HELICOPTERS, TRANSMISSIONS (MACHINE ELEMENTS), VIBRATION

**N86-25794\*#** National Aeronautics and Space Administration, Washington, D.C.  
**PROCEEDINGS OF A WORKSHOP ON APPLICATIONS OF TETHERS IN SPACE: EXECUTIVE SUMMARY**  
W. A. BARACAT, Compiler 1986 43 p Proc. held in Venice, Italy, 15-17 Oct. 1985  
(NASW-3921)  
(NASA-CP-2422; NAS 1.55:2422) Avail: NTIS HC A03/MF A01 CSCL 13I  
SPACE STATIONS, TETHERED SATELLITES, TETHERLINES

**N86-27644\*#** National Aeronautics and Space Administration, Washington, D.C.  
**APPLICATIONS OF TETHERS IN SPACE: WORKSHOP PROCEEDINGS, VOLUME 2**  
W. A. BARACAT, comp. (General Research Corp., McLean, Va.) Jun. 1986 502 p Workshop held in Venice, Italy, 15-17 Oct. 1985; sponsored by NASA, the Italian National Space Plan and CNR  
(NASW-3921)  
(NASA-CP-2422-VOL-2; NAS 1.55:2422-VOL-2) Avail: NTIS HC A23/MF A01 CSCL 13I  
REDUCED GRAVITY, SPACE PROCESSING, SPACE SHUTTLE PAYLOADS, SPACE STATIONS, TETHERED SATELLITES, TETHERLINES

**N86-28407\*#** National Aeronautics and Space Administration, Washington, D.C.  
**APPLICATIONS OF TETHERS IN SPACE: WORKSHOP PROCEEDINGS, VOLUME 1**  
W. A. BARACAT, comp. (General Research Corp., McLean, Va.) Jun. 1986 585 p Workshop held in Venice, Italy, 15-17 Oct. 1985; sponsored by NASA, the Italian National Space Plan and CNR  
(NASW-3921)  
(NASA-CP-2422-VOL-1; NAS 1.55:2422-VOL-1) Avail: NTIS HC A25/MF A01 CSCL 13I  
ELECTRODYNAMICS, TECHNOLOGY UTILIZATION, TETHERED SATELLITES, TETHERLINES

**N86-30160\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**INSTABILITY IN ROTATING MACHINERY**  
Dec. 1985 458 p Symposium held in Carson City, Nev., 10-14 Jun. 1985; sponsored by Bently Rotor Dynamics Research Corp. (NASA-CP-2409; E-2652; NAS 1.55:2409) Avail: NTIS HC A21/MF A01 CSCL 13I  
ANTIFRICTION BEARINGS, INTERNAL FRICTION, LOAD TESTS, ROTARY STABILITY, TURBOMACHINERY, VIBRATION MEASUREMENT

## 38

### QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

**N85-23090\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**RELIABILITY BOUNDS FOR FAULT-TOLERANT SYSTEMS WITH COMPETING RESPONSES TO COMPONENT FAILURES**  
L. D. LEE Apr. 1985 16 p refs  
(NASA-TP-2409; L-15853; NAS 1.60:2409) Avail: NTIS HC A02/MF A01 CSCL 14D  
COMPONENT RELIABILITY, FAILURE, FAULT TOLERANCE, MARKOV CHAINS

**N86-22962\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**ANALYTICAL ULTRASONICS IN MATERIALS RESEARCH AND TESTING**  
A. VARY Jan. 1986 357 p refs Conference held in Cleveland, Ohio, 13-14 Nov. 1984  
(NASA-CP-2383; E-2486; NAS 1.55:2383) Avail: NTIS HC A16/MF A01 CSCL 20A  
ACOUSTIC EMISSION, COMPOSITE MATERIALS, CONFERENCES, NONDESTRUCTIVE TESTS, ULTRASONIC RADIATION, ULTRASONICS, WAVE PROPAGATION

**N86-26639\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**EVALUATION OF MULTILAYER PRINTED WIRING BOARDS BY METALLOGRAPHIC TECHNIQUES: AN ILLUSTRATED GUIDE TO THE PREPARATION AND INSPECTION OF PLATED-THROUGH HOLE TEST COUPONS BASED ON THE REQUIREMENTS OF MIL-P-55110D**  
J. JELLISON May 1986 72 p refs  
(NASA-RP-1161; REPT-86B0088; NAS 1.61:1161) Avail: NTIS HC A04/MF A01 CSCL 14D

This work is an illustrated handbook containing the rationale and procedure for the evaluation of multilayer printed wiring board construction integrity with respect to plated-through holes in accordance with the requirements of MIL-P-55110D, Printed Wiring Boards. It is intended as a practical aid for those concerned with determining the construction integrity of multilayer boards for high reliability applications. Photomicrographs of cross sectioned holes illustrate defect types, acceptable and unacceptable conditions, and methods of measurement. A procedure for specimen preparation is given, and appropriate paragraphs of the military specification are included and explained. Author

**N86-32763\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**A METHOD FOR DEVELOPING DESIGN DIAGRAMS FOR CERAMIC AND GLASS MATERIALS USING FATIGUE DATA**  
T. M. HESLIN, M. B. MAGIDA, and K. A. FORREST Sep. 1986 55 p  
(NASA-RP-1174; NAS 1.61:1174) Avail: NTIS HC A04/MF A01 CSCL 14D

The service lifetime of glass and ceramic materials can be expressed as a plot of time-to-failure versus applied stress whose plot is parametric in percent probability of failure. This type of plot is called a design diagram. Confidence interval estimates for such plots depend on the type of test that is used to generate the data, on assumptions made concerning the statistical distribution of the test results, and on the type of analysis used. This report outlines the development of design diagrams for glass and ceramic materials in engineering terms using static or dynamic fatigue tests, assuming either no particular statistical distribution of test results or a Weibull distribution and using either median value or homologous ratio analysis of the test results. Author

## STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

**N78-12443\*#** National Aeronautics and Space Administration, Washington, D.C.

**SIXTH NASTRAN USERS' COLLOQUIUM**

Oct. 1977 473 p refs Colloq. held at Cleveland, 4-6 Oct. 1977

(NASA-CP-2018; E-9303) Avail: NTIS HC A20/MF A01 CSCL 20K

COMPUTER PROGRAMS, CONFERENCES, FINITE ELEMENT METHOD, NASTRAN, STRUCTURAL ANALYSIS, USER MANUALS (COMPUTER PROGRAMS)

**N78-12475\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**EFFECT OF END-RING STIFFNESS ON BUCKLING OF PRESSURE-LOADED STIFFENED CONICAL SHELLS**

R. C. DAVIS and J. G. WILLIAMS Washington Dec. 1977 33 p refs

(NASA-TP-1079; L-11915) Avail: NTIS HC A03/MF A01 CSCL 20K

BUCKLING, COMPRESSION LOADS, CONICAL SHELLS, STIFFENING

**N78-18459\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**DEVELOPMENT AND APPLICATION OF AN OPTIMIZATION PROCEDURE FOR FLUTTER SUPPRESSION USING THE AERODYNAMIC ENERGY CONCEPT**

E. NISSIM (Technion - Israel Inst. of Tech.) and I. ABEL Feb. 1978 39 p refs

(NASA-TP-1137; L-11909) Avail: NTIS HC A03/MF A01 CSCL 20K

FLUTTER ANALYSIS, GUSTS, TRANSFER FUNCTIONS, WING OSCILLATIONS

**N78-20536\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**GAUSSIAN STEP-PRESSURE LOADING OF RIGID VISCOPLASTIC PLATES Ph.D. Thesis**

R. J. HAYDUK and B. J. DURLING Mar. 1978 28 p refs

(NASA-TP-1123; L-11885) Avail: NTIS HC A03/MF A01

CSCL 20K

CIRCULAR PLATES, LOADS (FORCES), NORMAL DENSITY FUNCTIONS, PRESSURE DISTRIBUTION, VISCOELASTICITY

**N78-26494\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**LIGHT AIRPLANE CRASH TESTS AT THREE FLIGHT-PATH ANGLES**

C. B. CASTLE and E. ALFARO-BOU Jun. 1978 69 p refs Films supplement number L-1247 to this report is available on request

(NASA-TP-1210; L-12060) Avail: NTIS HC A04/MF A01 CSCL 01C

AIRCRAFT ACCIDENTS, CRASH LANDING, FLIGHT PATHS, IMPACT TESTS

**N78-28480\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**EXPERIMENTAL STUDIES OF EFFECTS OF TILT AND STRUCTURAL ASYMMETRY ON VIBRATION CHARACTERISTICS OF THIN-WALL CIRCULAR CYLINDERS PARTLY FILLED WITH LIQUID**

R. W. HERR Jul. 1978 41 p refs

(NASA-TP-1211; L-12049) Avail: NTIS HC A03/MF A01

CSCL 20K

ATTITUDE (INCLINATION), CIRCULAR CYLINDERS, LIQUID FILLED SHELLS, THIN WALLS, VIBRATION

**N78-28481\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**ANALYSIS OF PREFLUTTER AND POSTFLUTTER CHARACTERISTICS WITH MOTION-MATCHED AERODYNAMIC FORCES**

H. J. CUNNINGHAM Jul. 1978 33 p refs

(NASA-TP-1232; L-12109) Avail: NTIS HC A03/MF A01

CSCL 01C

AERODYNAMIC FORCES, AEROELASTICITY, FLUTTER ANALYSIS, LIFT DEVICES, PREDICTION ANALYSIS TECHNIQUES

**N78-28482\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**EVALUATION OF A HYBRID, ANISOTROPIC, MULTILAYERED, QUADRILATERAL FINITE ELEMENT**

J. C. ROBINSON and C. L. BLACKBURN (Tenn. Univ. at Nashville) Aug. 1978 31 p refs

(NASA-TP-1236; L-12113) Avail: NTIS HC A03/MF A01

CSCL 02K

BEAMS (SUPPORTS), DYNAMIC STRUCTURAL ANALYSIS, FINITE ELEMENT METHOD, LAMINATES, PLATES (STRUCTURAL MEMBERS)

**N78-30610\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

**MICROSTRUCTURE AND MECHANICAL PROPERTIES OF QUENCHED AND TEMPERED 300M STEEL**

J. L. YOUNGBLOOD and M. RAGHAVAN Aug. 1978 40 p refs

(NASA-TP-1288; JSC-13854; S-483) Avail: NTIS HC A03/MF A01 CSCL 11F

HIGH STRENGTH STEELS, LANDING GEAR, MECHANICAL PROPERTIES, MICROSTRUCTURE, QUENCHING (COOLING), SPACE SHUTTLE ORBITERS

**N78-32466\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**SEVENTH NASTRAN USER'S COLLOQUIUM**

Oct. 1978 499 p refs Colloquium held at Huntsville, Ala., 4-6 Oct. 1978

(NASA-CP-2062) Avail: NTIS HC A21/MF A01 CSCL 20K CONFERENCES, NASTRAN, STRUCTURAL ANALYSIS

**N78-32492\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**BUCKLING AND STRUCTURAL EFFICIENCY OF SANDWICH-BLADE STIFFENED COMPOSITE COMPRESSION PANELS**

M. STEIN and J. G. WILLIAMS Sep. 1978 40 p refs

(NASA-TP-1269; L-12242) Avail: NTIS HC A03/MF A01

CSCL 20K

BLADES, COMPOSITE STRUCTURES, CREEP BUCKLING, SANDWICH STRUCTURES, STRUCTURAL FAILURE

## 39 STRUCTURAL MECHANICS

**N79-10448\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **RESEARCH IN COMPUTERIZED STRUCTURAL ANALYSIS AND SYNTHESIS**

H. G. MCCOMB, JR., comp. Oct. 1978 224 p refs Presented at a Symp. on Future Trends in Computerized Structural Analysis and Syn., Washington, D. C., 30 Oct. - 1 Nov. 1978; sponsored by George Washington Univ. and NSF and the Am. Soc. of Civil Engrs.

(NASA-CP-2059; L-12507) Avail: NTIS HC A10/MF A01

CSCL 20K

COMPUTER AIDED DESIGN, COMPUTERIZED SIMULATION, DYNAMIC STRUCTURAL ANALYSIS

**N79-17264\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AN ANALYTICAL TECHNIQUE FOR PREDICTING THE CHARACTERISTICS OF A FLEXIBLE WING EQUIPPED WITH AN ACTIVE FLUTTER-SUPPRESSION SYSTEM AND COMPARISON WITH WIND-TUNNEL DATA**

I. ABEL Feb. 1979 45 p refs

(NASA-TP-1367; L-12567) Avail: NTIS HC A03/MF A01

CSCL 20K

FLEXIBLE WINGS, FLUTTER ANALYSIS, PERFORMANCE PREDICTION, VIBRATION DAMPING, WIND TUNNEL TESTS

**N79-21422\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **RECENT ADVANCES IN STRUCTURES FOR HYPERSONIC FLIGHT, PART 1**

1978 533 p refs Symp. held at Hampton, Va., 6-8 Sep. 1978

(NASA-CP-2065-PT-1; L-12653-PT-1) Avail: NTIS HC A23/MF

A01 CSCL 20K

AIRCRAFT DESIGN, AIRCRAFT STRUCTURES, CONFERENCES, HYPERSONIC AIRCRAFT, STRUCTURAL DESIGN

**N79-21435\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **RECENT ADVANCES IN STRUCTURES FOR HYPERSONIC FLIGHT, PART 2**

1978 408 p refs Symp. held at Hampton, Va., 6-8 Sep. 1978

(NASA-CP-2065-PT-2; L-12653-PT-2) Avail: NTIS HC A18/MF

A01 CSCL 20K

ANIONS, CONFERENCES, HYPERSONIC FLIGHT

**N79-22539\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **THE 13TH AEROSPACE MECHANISMS SYMPOSIUM**

A. C. BOND 1979 300 p refs Proc. of Symp. held at Houston, Tex., 26-27 Apr. 1979

(NASA-CP-2081; S-496) Avail: NTIS HC A13/MF A01 CSCL

13I

AERONAUTICAL ENGINEERING, CONFERENCES, ELECTRO-MECHANICAL DEVICES, EXPERIMENT DESIGN, MECHANICAL DEVICES

**N79-24372\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **VIBRATION CHARACTERISTICS OF WALLS AND A PLATE GLASS WINDOW REPRESENTATIVE OF THOSE OF A WOOD-FRAME HOUSE**

H. D. CARDEN May 1979 53 p refs

(NASA-TP-1447; L-12729) Avail: NTIS HC A04/MF A01

CSCL 20K

CONSTRUCTION MATERIALS, VIBRATION EFFECTS, WOODEN STRUCTURES

**N79-25427\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **APPROXIMATION METHODS FOR COMBINED THERMAL/STRUCTURAL DESIGN**

R. T. HAFTKA (Illinois Inst. of Tech.) and C. P. SHORE Jun. 1979 35 p refs

(NASA-TP-1428; L-12674) Avail: NTIS HC A03/MF A01

CSCL 20K

APPROXIMATION, INSULATED STRUCTURES, STRUCTURAL DESIGN CRITERIA, THERMAL STRESSES

**N79-28614\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A METHOD FOR OBTAINING PRACTICAL FLUTTER-SUPPRESSION CONTROL LAWS USING RESULTS OF OPTIMAL CONTROL THEORY**

J. R. NEWSON Aug. 1979 34 p refs

(NASA-TP-1471; L-12728) Avail: NTIS HC A03/MF A01

CSCL 20K

AEROELASTICITY, CONTROL THEORY, FLUTTER, OPTIMAL CONTROL, VIBRATION DAMPING

**N79-31626\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A CRITICAL EXAMINATION OF STRESSES IN AN ELASTIC SINGLE LAP JOINT**

P. A. COOPER and J. W. SAWYER Sep. 1979 61 p refs

(NASA-TP-1507; L-12802) Avail: NTIS HC A04/MF A01

CSCL 20K

FINITE ELEMENT METHOD, LAP JOINTS, NUMERICAL ANALYSIS, STRESS ANALYSIS

**N79-33500\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LOAD CONCENTRATION DUE TO MISSING MEMBERS IN PLANAR FACES OF A LARGE SPACE TRUSS**

J. E. WALTZ Washington Oct. 1979 39 p refs

(NASA-TP-1522; L-12872) Avail: NTIS HC A03/MF A01

CSCL 20K

LARGE SPACE STRUCTURES, LOADS (FORCES), STRESS CONCENTRATION, TRUSSES

**N80-10512\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LIGHT AIRPLANE CRASH TESTS AT THREE ROLL ANGLES**

C. B. CASTLE and E. ALFARO-BOU Washington Oct. 1979 77 p refs

(NASA-TP-1477; L-12778) Avail: NTIS HC A05/MF A01

CSCL 01C

CRASHES, GENERAL AVIATION AIRCRAFT, IMPACT TESTS, ROLL

**N80-11505\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LIGHT AIRPLANE CRASH TESTS AT THREE PITCH ANGLES**

V. L. VAUGHAN, JR. and E. ALFARO-BOU Nov. 1979 62 p refs

(NASA-TP-1481) Avail: NTIS HC A04/MF A01 CSCL 01C

CRASH LANDING, GENERAL AVIATION AIRCRAFT, IMPACT TESTS, LIGHT AIRCRAFT

**N80-12438\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PRELIMINARY DESIGN PROCEDURE FOR INSULATED STRUCTURES SUBJECTED TO TRANSIENT HEATING**

H. M. ADELMAN Washington Dec. 1979 53 p refs

(NASA-TP-1534; L-13144) Avail: NTIS HC A04/MF A01

CSCL 20L

AIRFRAME MATERIALS, REENTRY SHIELDING, THERMAL INSULATION, TRANSIENT HEATING

**N80-13512\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYSIS OF SURFACE CRACKS IN FINITE PLATES UNDER TENSION OR BENDING LOADS**

J. C. NEWMAN, JR. and I. S. RAJU (Joint Inst. for the Advancement of Flight Sciences, Hampton, Va.) Dec. 1979 46 p refs (NASA-TP-1578; L-13053) Avail: NTIS HC A03/MF A01 CSCL 20K

BENDING FATIGUE, ELASTIC PLATES, FINITE ELEMENT METHOD, STRESS ANALYSIS, SURFACE CRACKS, TENSILE STRESS

**N80-15428\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**A RELATION BETWEEN SEMIEMPIRICAL FRACTURE ANALYSES AND R-CURVES**

T. W. ORANGE Jan. 1980 45 p refs (NASA-TP-1600; E-9963) Avail: NTIS HC A03/MF A01 CSCL 20K

FAILURE ANALYSIS, FRACTURE MECHANICS, FRACTURE STRENGTH

**N80-18427\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STRESS ANALYSIS AND BUCKLING OF J-STIFFENED GRAPHITE-EPOXY PANEL**

R. C. DAVIS Washington Feb. 1980 23 p refs (NASA-TP-1607; L-13256) Avail: NTIS HC A02/MF A01 CSCL 20K

BUCKLING, GRAPHITE-EPOXY COMPOSITES, RIGID STRUCTURES, STRESS ANALYSIS

**N80-19563\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HYDROELASTIC VIBRATION ANALYSIS OF PARTIALLY LIQUID-FILLED SHELLS USING A SERIES REPRESENTATION OF THE LIQUID**

J. M. HOUSNER, R. W. HERR, and J. L. SEWALL Mar. 1980 68 p refs (NASA-TP-1558; L-13279) Avail: NTIS HC A04/MF A01 CSCL 20K

HYDROELASTICITY, LIQUID FILLED SHELLS, PROPELLANT TANKS, SERIES (MATHEMATICS), STRUCTURAL VIBRATION

**N80-20619\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**ON THE NONLINEAR DEFORMATION GEOMETRY OF EULER-BERNOULLI BEAMS**

D. H. HODGES, R. A. ORMISTON, and D. A. PETERS Apr. 1980 57 p refs (NASA-TP-1566; A-7985; AVRADCOM-TR-80-A-1) Avail: NTIS HC A04/MF A01 CSCL 20K

DEFORMATION, NONLINEAR SYSTEMS, ROTARY WINGS, ROTATING BODIES

**N80-22734\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**NONLINEAR, THREE-DIMENSIONAL FINITE-ELEMENT ANALYSIS OF AIR-COOLED GAS TURBINE BLADES**

A. KAUFMAN and R. E. GAUGLER Apr. 1980 22 p refs (NASA-TP-1669; E-074) Avail: NTIS HC A02/MF A01 CSCL 21E

AIR COOLING, FINITE ELEMENT METHOD, GAS TURBINES, TURBINE BLADES

**N80-22737\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPLICATION OF TWO DESIGN METHODS FOR ACTIVE FLUTTER SUPPRESSION AND WIND-TUNNEL TEST RESULTS**

J. R. NEWSOM, I. ABEL, and H. J. DUNN May 1980 84 p refs (NASA-TP-1653; L-13177) Avail: NTIS HC A05/MF A01 CSCL 20L

AERODYNAMICS, CONTROL THEORY, ENERGY METHODS, FLUTTER, OPTIMAL CONTROL, WIND TUNNEL TESTS

**N80-23677\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**ELASTIC CONSTANTS FOR SUPERPLASTICALLY FORMED/DIFFUSION-BONDED CORRUGATED SANDWICH CORE**

W. L. KO May 1980 82 p refs (NASA-TP-1562; H-1094) Avail: NTIS HC A05/MF A01 CSCL 20K

DIFFUSION WELDING, ELASTIC PROPERTIES, SANDWICH STRUCTURES, STRUCTURAL STABILITY, SUPERPLASTICITY

**N80-24648\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**EIGHTH NASTRAN USER'S COLLOQUIUM**

May 1980 242 p refs Colloq. held at Greenbelt, Md., 30-31 Oct. 1979

(NASA-CP-2131) Avail: NTIS HC A11/MF A01 CSCL 20K CONFERENCES, FINITE ELEMENT METHOD, NASTRAN

**N80-27719\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPARISON OF ELASTIC AND ELASTIC-PLASTIC STRUCTURAL ANALYSES FOR COOLED TURBINE BLADE AIRFOILS**

A. KAUFMAN Jul. 1980 15 p refs (NASA-TP-1679; E-241) Avail: NTIS HC A02/MF A01 CSCL 20K

AIRFOILS, ELASTOPLASTICITY, STRESS-STRAIN RELATIONSHIPS, STRUCTURAL ANALYSIS, TURBINE BLADES

**N80-32756\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RESEARCH IN NONLINEAR STRUCTURAL AND SOLID MECHANICS**

H. G. MCCOMB, JR., comp. and A. K. NOOR, comp. (Joint Inst. for Advancement of Flight Sciences, Hampton, Va.) 1980 287 p refs Symp. on Computational Methods in Nonlinear Struct. and Solid Mech. held in Washington, D.C., 6-8 Oct. 1980; sponsored by NASA, George Washington Univ., NSF, ASCE and ASME (NASA-CP-2147; L-13950) Avail: NTIS HC A13/MF A01 CSCL 20K

DEFORMATION, MATHEMATICAL MODELS, NEWTON THEORY, NONLINEAR SYSTEMS, SOLID MECHANICS, STRUCTURAL ANALYSIS

**N80-33782\*#** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

**NINTH NASTRAN USERS' COLLOQUIUM**

Oct. 1980 248 p refs Colloq. held in Cocoa Beach, Fla., 22-23 Oct. 1980

(NASA-CP-2151) Avail: NTIS HC A11/MF A01 CSCL 20K CONFERENCES, FINITE ELEMENT METHOD, NASTRAN, STRUCTURAL ANALYSIS

**N81-11417\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**METHOD FOR ESTIMATING CRACK-EXTENSION RESISTANCE CURVE FROM RESIDUAL STRENGTH DATA**

T. W. ORANGE Nov. 1980 15 p refs (NASA-TP-1753; E-439) Avail: NTIS HC A02/MF A01 CSCL 20K

CRACKING (FRACTURING), FAILURE ANALYSIS, FRACTURE STRENGTH, LOADS (FORCES)

## 39 STRUCTURAL MECHANICS

**N81-11422\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN ANALYTICAL TECHNIQUE FOR APPROXIMATING UNSTEADY AERODYNAMICS IN THE TIME DOMAIN**

H. J. DUNN Nov. 1980 31 p refs  
(NASA-TP-1738; L-13255) Avail: NTIS HC A03/MF A01  
CSCL 20K

AERODYNAMIC FORCES, AEROELASTICITY, LEAST SQUARES METHOD, MATHEMATICAL MODELS, PADE APPROXIMATION, WING LOADING

**N81-13373\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A NEW LOOK AT NUMERICAL ANALYSES OF FREE-EDGE STRESSES IN COMPOSITE LAMINATES**

I. S. RAJU, J. D. WHITCOMB, and J. G. GOREE (Clemson Univ.)  
Dec. 1980 37 p refs  
(NASA-TP-1751; L-13777) Avail: NTIS HC A03/MF A01  
CSCL 20K

GRAPHITE-EPOXY COMPOSITES, NUMERICAL ANALYSIS, STRESSES

**N81-14343\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VIBRATION CHARACTERISTICS OF A STEADILY ROTATING SLENDER RING**

F. J. LALLMAN Dec. 1980 100 p refs  
(NASA-TP-1775; L-13386) Avail: NTIS HC A05/MF A01  
CSCL 20K

DYNAMIC RESPONSE, SPACECRAFT DESIGN, VIBRATION MODE

**N81-22388\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THE 15TH AEROSPACE MECHANISMS SYMPOSIUM**

1981 433 p refs Symp. held in Huntsville, Ala., 14-15 May 1981; sponsored in part by California Inst. of Technology and Lockheed Missiles and Space Co., Inc.  
(NASA-CP-2181) Avail: NTIS HC A19/MF A01 CSCL 20K

ACTUATORS, ANTENNAS, CONFERENCES, DEPLOYMENT, EGRESS, ESCAPE SYSTEMS, EXTRAVEHICULAR ACTIVITY, LARGE SPACE STRUCTURES, MECHANICAL DRIVES, REFLECTORS, SPACE ERECTABLE STRUCTURES, SPACECRAFT CONTROL, SPACECRAFT PROPULSION, SPACECREWS

**N81-23486\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MEGA16 - COMPUTER PROGRAM FOR ANALYSIS AND EXTRAPOLATION OF STRESS-RUPTURE DATA**

C. R. ENSIGN May 1981 46 p refs  
(NASA-TP-1809; E-495) Avail: NTIS HC A03/MF A01 CSCL 20K

COMPUTER PROGRAMS, CREEP RUPTURE STRENGTH, EXTRAPOLATION, FAILURE ANALYSIS, RELIABILITY ANALYSIS, STRESS ANALYSIS

**N81-24471\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATIC AND YAWED-ROLLING MECHANICAL PROPERTIES OF TWO TYPE 7 AIRCRAFT TIRES**

J. A. TANNER, S. M. STUBBS, and J. L. MCCARTY May 1981 80 p refs  
(NASA-TP-1863; L-14125) Avail: NTIS HC A05/MF A01  
CSCL 20K

AIRCRAFT TIRES, MECHANICAL PROPERTIES, ROLLING MOMENTS, STATIC LOADS, YAWING MOMENTS

**N81-71592\*** National Aeronautics and Space Administration, Washington, D.C.

**THE NASTRAN DEMONSTRATION PROBLEM MANUAL, LEVEL 17.5**

Dec. 1978 185 p refs  
(NASA-SP-224(05))

**N81-71594\*** National Aeronautics and Space Administration, Washington, D.C.

**THE NASTRAN PROGRAMMERS MANUAL, LEVEL 17.5**

Dec. 1978 845 p refs  
(NASA-SP-223(05))

**N82-10430\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CORNERING CHARACTERISTICS OF THE NOSE-GEAR TIRE OF THE SPACE SHUTTLE ORBITER**

W. A. VOGLER (Kentron International, Inc., Hampton, Va.) and J. A. TANNER Oct. 1981 29 p refs  
(NASA-TP-1917; L-14681) Avail: NTIS HC A03/MF A01  
CSCL 20K

AERODYNAMIC CHARACTERISTICS, LANDING GEAR, NOSE TIRES, SPACE SHUTTLE ORBITERS

**N82-11488\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN IMPROVED TRANSVERSE SHEAR DEFORMATION THEORY FOR LAMINATED ANISOTROPIC PLATES**

M. V. V. MURTHY Nov. 1981 39 p refs  
(NASA-TP-1903; L-14533) Avail: NTIS HC A03/MF A01  
CSCL 20K

ANISOTROPIC PLATES, ELASTIC BENDING, LAMINATES, SHEAR STRESS

**N82-11489\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RESEARCH IN NONLINEAR STRUCTURAL AND SOLID MECHANICS**

H. G. MCCOMB, JR., comp. and A. K. NOOR, comp. (Joint Inst. for Advancement of Flight Sciences) Jun. 1981 44 p refs  
Presented at Symp. held at Washington, D.C., 6-8 Oct. 1980; Sponsored by George Washington Univ., NSF, American Society of Civil Engineers and ASME  
(NASA-CP-2147-SUPPL; L-13950) Avail: NTIS HC A03/MF A01  
CSCL 20K

COMPUTER AIDED DESIGN, MECHANICAL ENGINEERING, SOLID MECHANICS, STRUCTURAL ENGINEERING

**N82-20565\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ELASTIC-PLASTIC FINITE-ELEMENT ANALYSES OF THERMALLY CYCLED SINGLE-EDGE WEDGE SPECIMENS**

A. KAUFMAN Mar. 1982 27 p refs  
(NASA-TP-1982; E-687; NAS 1.60:1982) Avail: NTIS HC A03/MF A01 CSCL 20K

ELASTOPLASTICITY, FLUIDIZED BED PROCESSORS, STAINLESS STEELS, STRESS-STRAIN RELATIONSHIPS, THERMAL CYCLING TESTS, WEDGES

**N82-20566\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ELASTIC-PLASTIC FINITE-ELEMENT ANALYSES OF THERMALLY CYCLED DOUBLE-EDGE WEDGE SPECIMENS**

A. KAUFMAN and L. E. HUNT Mar. 1982 31 p refs  
(NASA-TP-1973; E-626; NAS 1.60:1973) Avail: NTIS HC A03/MF A01 CSCL 20K

ALLOYS, ELASTIC PROPERTIES, ENGINE PARTS, FINITE ELEMENT METHOD, PLASTIC PROPERTIES, STRESS ANALYSIS, STRESS-STRAIN RELATIONSHIPS, THERMAL CYCLING TESTS, WEDGES

**N82-20567\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DESIGN DETAIL VERIFICATION TESTS FOR A LIGHTLY LOADED OPEN-CORRUGATION GRAPHITE-EPOXY CYLINDER**

R. C. DAVIS and J. H. STARNES, JR. Mar. 1982 26 p refs  
(NASA-TP-1981; L-14795; NAS 1.60:1981) Avail: NTIS HC A03/MF A01 CSCL 20K

CORRUGATED SHELLS, CYLINDRICAL SHELLS, GRAPHITE-EPOXY COMPOSITES, LOAD TESTS

**N82-26703\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPARISON OF ANALYTICAL AND WIND-TUNNEL RESULTS FOR FLUTTER AND GUST RESPONSE OF A TRANSPORT WING WITH ACTIVE CONTROLS**

I. ABEL, B. PERRY, III, and J. R. NEWSOM Jun. 1982 47 p refs

(NASA-TP-2010; L-15099; NAS 1.60:2010) Avail: NTIS HC A03/MF A01 CSCL 01C

ACTIVE CONTROL, AEROELASTICITY, DAMPING, DYNAMIC RESPONSE, FLUTTER, GUST LOADS, WING LOADING

**N82-28665\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**BUCKLING TEST OF A 3-METER-DIAMETER CORRUGATED GRAPHITE-EPOXY RING-STIFFENED CYLINDER**

R. C. DAVIS Jul. 1982 28 p refs

(NASA-TP-2032; L-14659; NAS 1.60:2032) Avail: NTIS HC A03/MF A01 CSCL 20K

BUCKLING, CORRUGATED SHELLS, CYLINDRICAL SHELLS, GRAPHITE-EPOXY COMPOSITES, REINFORCEMENT RINGS

**N82-33739\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RESEARCH IN STRUCTURAL AND SOLID MECHANICS, 1982 Research-in-Progress Reports**

J. M. HOUSNER, comp. and A. K. NOOR, comp. (George Washington Univ., Washington, D.C.) Oct. 1982 427 p refs Proc. of Symp. on Advan. and Trends in Struct. and Solid Mech., Washington, D.C., 4-7 Oct. 1982; sponsored in cooperation with NSF, AFOSR, ONR, American Society of Civil Engineers and American Society of Mechanical Engineers

(NASA-CP-2245; L-15506; NAS 1.55:2245) Avail: NTIS HC A19/MF A01 CSCL 20K

BOUNDARY ELEMENT METHOD, DEGREES OF FREEDOM, DYNAMIC RESPONSE, ELASTOPLASTICITY, IMPACT STRENGTH, NONLINEAR EQUATIONS, RELAXATION (MECHANICS), SOLID MECHANICS, STRUCTURAL ANALYSIS

**N83-10442\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CRASH TESTS OF FOUR LOW-WING TWIN-ENGINE AIRPLANES WITH TRUSS-REINFORCED FUSELAGE STRUCTURE**

M. S. WILLIAMS and E. L. FASANELLA (Kentron International, Inc.) Sep. 1982 120 p refs

(NASA-TP-2070; L-15379; NAS 1.60:2070) Avail: NTIS HC A06/MF A01 CSCL 20K

AIRCRAFT SAFETY, CRASHES, CRASHWORTHINESS, FUSELAGES, GENERAL AVIATION AIRCRAFT, IMPACT TESTS, REINFORCEMENT (STRUCTURES), TRUSSES

**N83-11513\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHTWEIGHT RADIANTLY AND ACTIVELY COOLED PANEL: THERMAL AND STRUCTURAL PERFORMANCE**

C. P. SHORE, R. J. NOWAK, and H. N. KELLY Jan. 1982 53 p refs

(NASA-TP-2074; L-15292; NAS 1.60:2074) Avail: NTIS HC A04/MF A01 CSCL 20K

AIRCRAFT STRUCTURES, COOLANTS, HEAT SHIELDING, HYPERSONIC AIRCRAFT, PANELS, RADIANT COOLING

**N83-12449\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MATERIALS CONSTITUTIVE MODELS FOR NONLINEAR ANALYSIS OF THERMALLY CYCLED STRUCTURES**

A. KAUFMAN and L. E. HUNT (Arizona Univ., Tucson) Oct. 1982 26 p refs

(NAG3-45)

(NASA-TP-2055; E-1125; NAS 1.60:2055) Avail: NTIS HC A03/MF A01 CSCL 20K

CONSTITUTIVE EQUATIONS, INELASTIC STRESS, SERVICE LIFE, STRUCTURAL ANALYSIS

**N83-12452\*#** Georgia Univ., Athens. Computer Software Management and Information Center.

**TENTH NASTRAN USER'S COLLOQUIUM**

Nov. 1982 273 p refs Colloq. held at New Orleans, 13-14 May 1982 Sponsored by NASA

(NASA-CP-2249; NAS 1.55:2249) Avail: NTIS HC A12/MF A01 CSCL 20K

AXISYMMETRIC FLOW, ELASTOPLASTICITY, FINITE ELEMENT METHOD, HARMONIC FUNCTIONS, NASTRAN, STRUCTURAL ANALYSIS

**N83-14521\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CORRELATION AND ASSESSMENT OF STRUCTURAL AIRPLANE CRASH DATA WITH FLIGHT PARAMETERS AT IMPACT**

H. D. CARDEN Nov. 1982 44 p refs

(NASA-TP-2083; L-15431; NAS 1.60:2083) Avail: NTIS HC A03/MF A01 CSCL 20K

AIRCRAFT ACCIDENTS, CRASH INJURIES, CRASHES, IMPACT RESISTANCE, IMPACT TESTS

**N83-16785\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VIBRATION STUDIES OF A LIGHTWEIGHT THREE-SIDED MEMBRANE SUITABLE FOR SPACE APPLICATION**

J. L. SEWELL, R. MISERENTINO, and R. S. PAPPAS Jan. 1983 49 p refs

(NASA-TP-2095; L-15247; NAS 1.60:2095) Avail: NTIS HC A03/MF A01 CSCL 20K

DYNAMIC RESPONSE, LARGE SPACE STRUCTURES, MEMBRANES, REFLECTORS, SPACECRAFT ANTENNAS, STRUCTURAL VIBRATION

**N83-21391\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TIRE MODELING**

J. A. TANNER, comp. Washington Mar. 1983 245 p refs Workshop held in Hampton, Va., 7-9 Sep. 1982

(NASA-CP-2264; L-15578; NAS 1.55:2264) Avail: NTIS HC A11/MF A01 CSCL 20K

CONFERENCES, DYNAMIC TESTS, FINITE ELEMENT METHOD, TIRES

**N83-24881\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**THE 17TH AEROSPACE MECHANISMS SYMPOSIUM**

May 1983 390 p refs Symp. held in Pasadena, Calif., 5-6 May 1983; sponsored by NASA, California Inst. of Tech., and LMSC

(NASA-CP-2273; NAS 1.55:2273) Avail: NTIS HC A17/MF A01 CSCL 20K

ACTUATORS, CONFERENCES, CONTROL EQUIPMENT, DEPLOYMENT, ELECTROMECHANICAL DEVICES, SOLAR ARRAYS, SPACECRAFT LUBRICATION, TETHERED SATELLITES

## 39 STRUCTURAL MECHANICS

**N83-28491\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**VIBRATION CHARACTERISTICS OF A DEPLOYABLE CONTROLLABLE-GEOMETRY TRUSS BOOM**  
J. T. DORSEY Jun. 1983 30 p refs  
(NASA-TP-2160; L-15580; NAS 1.60:2160) Avail: NTIS HC A03/MF A01 CSCL 20K  
BOOMS (EQUIPMENT), CANTILEVER BEAMS, DEPLOYMENT, LARGE SPACE STRUCTURES, TRUSSES, VIBRATION

**N83-33216\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EFFECT OF STRAIN ISOLATOR PAD MODULUS ON INPLANE STRAIN IN SHUTTLE ORBITER THERMAL PROTECTION SYSTEM TILES**  
J. W. SAWYER Aug. 1983 48 p refs  
(NASA-TP-2141; L-15575; NAS 1.60:2141) Avail: NTIS HC A03/MF A01 CSCL 20K  
CERAMICS, CUSHIONS, HEAT SHIELDING, PAD, SPACE SHUTTLE ORBITERS, STRAIN RATE, THERMAL PROTECTION, TILES

**N83-33217\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**TEMPERATURE DISTRIBUTION IN AN AIRCRAFT TIRE AT LOW GROUND SPEEDS**  
J. L. MCCARTY and J. A. TANNER Aug. 1983 36 p refs  
(NASA-TP-2195; L-15605; NAS 1.60:2195) Avail: NTIS HC A03/MF A01 CSCL 20K  
AIRCRAFT TIRES, GROUND SPEED, LOW SPEED, TAXIING, TEMPERATURE DISTRIBUTION

**N83-34351\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**NONLINEAR CONSTITUTIVE RELATIONS FOR HIGH TEMPERATURE APPLICATIONS**  
Mar. 1983 360 p refs Symp. held in Akron, Ohio, 19-20 May 1982; sponsored by Akron Univ.  
(NASA-CP-2271; E-1541; NAS 1.55:2271) Avail: NTIS HC A16/MF A01 CSCL 20K  
CONFERENCES, DESIGN ANALYSIS, FRACTURE MECHANICS, REACTION KINETICS, STRUCTURAL DESIGN CRITERIA

**N83-34372\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**SIMPLIFIED METHOD FOR NONLINEAR STRUCTURAL ANALYSIS**  
A. KAUFMAN Sep. 1983 15 p refs  
(NASA-TP-2208; E-1646; NAS 1.60:2208) Avail: NTIS HC A02/MF A01 CSCL 20K  
CYCLIC LOADS, ELASTIC DEFORMATION, GAS TURBINE ENGINES, STRESS-STRAIN RELATIONSHIPS, STRUCTURAL ANALYSIS, THERMOMECHANICAL TREATMENT

**N83-34373\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**A SOLUTION PROCEDURE FOR BEHAVIOR OF THICK PLATES ON A NONLINEAR FOUNDATION AND POSTBUCKLING BEHAVIOR OF LONG PLATES**  
M. STEIN and P. A. STEIN Sep. 1978 40 p refs  
(NCC1-15)  
(NASA-TP-2174; L-15587; NAS 1.60:2174) Avail: NTIS HC A03/MF A01 CSCL 20K  
BUCKLING, NONLINEARITY, PLATES (STRUCTURAL MEMBERS), STRUCTURAL STRAIN

**N84-13614\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**THEORETICAL BASIS FOR DESIGN OF THERMAL-STRESS-FREE FASTENERS**  
M. L. BLOSSER and R. R. MCWITHEY Dec. 1983 24 p refs  
(NASA-TP-2226; L-15658; NAS 1.60:2226) Avail: NTIS HC A02/MF A01 CSCL 20K  
CARBON-CARBON COMPOSITES, CONES, FASTENERS, JOINTS (JUNCTIONS), THERMAL EXPANSION, THERMAL STRESSES

**N84-15590\*#** Computer Software Management and Information Center, Athens, Ga.  
**ELEVENTH NASTRAN USER'S COLLOQUIUM**  
Washington Nov. 1983 310 p refs Colloq. held in San Francisco, 2-6 May 1983 Sponsored by NASA, Washington  
(NASA-CP-2284; NAS 1.55:2284) Avail: NTIS HC A14/MF A01 CSCL 20K  
COMPUTER PROGRAMS, CONFERENCES, DYNAMIC RESPONSE, FINITE ELEMENT METHOD, STRUCTURAL ANALYSIS, STRUCTURAL DESIGN CRITERIA, STRUCTURAL MEMBERS

**N84-16585\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**BUCKLING LOADS OF STIFFENED PANELS SUBJECTED TO COMBINED LONGITUDINAL COMPRESSION AND SHEAR: RESULTS OBTAINED WITH PASCO, EAL, AND STAGS COMPUTER PROGRAMS**  
W. J. STROUD, W. H. GREENE, and M. S. ANDERSON Jan. 1984 79 p refs  
(NASA-TP-2215; NAS 1.60:2215; L-15630) Avail: NTIS HC A05/MF A01 CSCL 20K  
BUCKLING, COMPOSITE MATERIALS, COMPRESSION LOADS, COMPUTER PROGRAMS, PANELS, SHEAR STRESS, STIFFENING

**N84-18675\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**STRUCTURAL EFFICIENCY STUDIES OF CORRUGATED COMPRESSION PANELS WITH CURVED CAPS AND BEADED WEBS**  
R. C. DAVIS, C. T. MILLS (Old Dominion Univ.), R. PRABHAKARAN (Old Dominion Univ.), and L. R. JACKSON Feb. 1984 26 p refs  
(NASA-TP-2272; L-15703; NAS 1.60:2272) Avail: NTIS HC A03/MF A01 CSCL 20K  
COMPOSITE MATERIALS, COMPRESSIVE STRENGTH, CORRUGATING, CURVATURE, MEMBRANES, PANELS, STRUCTURAL ANALYSIS

**N84-18677\*#** National Aeronautics and Space Administration. Washington, D.C.  
**THE NASTRAN THEORETICAL MANUAL**  
Jan. 1981 944 p  
(NASA-SP-221(06); NAS 1.21:221(06)) Avail: NTIS HC A99/MF A01 CSCL 20K  
Designed to accomodate additions and modifications, this commentary on NASTRAN describes the problem solving capabilities of the program in a narrative fashion and presents developments of the analytical and numerical procedures that underlie the program. Seventeen major sections and numerous subsections cover; the organizational aspects of the program, utility matrix routines, static structural analysis, heat transfer, dynamic structural analysis, computer graphics, special structural modeling techniques, error analysis, interaction between structures and fluids, and aeroelastic analysis. A.R.H.



**N84-20878\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**DEVELOPMENT OF A SIMPLIFIED PROCEDURE FOR CYCLIC STRUCTURAL ANALYSIS**

A. KAUFMAN Mar. 1984 20 p refs Proposed for presentation at the 29th ASME Intern. Gas Turbine Conf., Amsterdam, 3-7 Jun. 1984

(NASA-TP-2243; E-1855; NAS 1.60:2243) Avail: NTIS HC A02/MF A01 CSCL 20K

COMPUTER PROGRAMS, CYCLIC LOADS, INELASTIC STRESS, NONLINEARITY, STRESS-STRAIN RELATIONSHIPS, STRUCTURAL ANALYSIS

**N84-21899\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE NASTRAN USER'S MANUAL**

Sep. 1983 1572 p

(NASA-SP-222(06); NAS 1.12/6:222(06)) Avail: NTIS HC A99/MF A01 CSCL 20K

All information directly associated with problem solving using the NASTRAN program is presented. This structural analysis program uses the finite element approach to structural modeling wherein the distributed finite properties of a structure are represented by a finite element of structural elements which are interconnected at a finite number of grid points, to which loads are applied and for which displacements are calculated. Procedures are described for defining and loading a structural model. Functional references for every card used for structural modeling, the NASTRAN data deck and control cards, problem solution sequences (rigid formats), using the plotting capability, writing a direct matrix abstraction program, and diagnostic messages are explained. A dictionary of mnemonics, acronyms, phrases, and other commonly used NASTRAN terms is included. A.R.H.

**N84-21901\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SURVEY OF NASA RESEARCH ON CRASH DYNAMICS**

R. G. THOMSON, H. D. CARDEN, and R. J. HAYDUK Apr. 1984 46 p refs

(NASA-TP-2298; L-15757; NAS 1.60:2298) Avail: NTIS HC A03/MF A01 CSCL 20K

AIRCRAFT ACCIDENTS, AIRFRAMES, DYNAMIC STRUCTURAL ANALYSIS, FLOORS, SEATS

**N84-25078\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE 18TH AEROSPACE MECHANISMS SYMPOSIUM**

Washington May 1984 321 p refs Symp. held in Greenbelt, Md., 2-4 May 1984; sponsored by NASA, the California Inst. of Tech., and LMSC

(NASA-CP-2311; REPT-84FO235; NAS 1.55:2311) Avail: NTIS HC A14/MF A01 CSCL 20K

AEROSPACE ENGINEERING, DESIGN ANALYSIS, FOLDING STRUCTURES, LARGE SPACE STRUCTURES, PAYLOAD TRANSFER, PERFORMANCE TESTS, SPACEBORNE EXPERIMENTS

**N84-26053\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECT OF PREFORMING ADHERENDS ON STATIC AND FATIGUE STRENGTH OF BONDED COMPOSITE SINGLE-LAP JOINTS**

J. W. SAWYER Jun. 1984 17 p refs

(NASA-TP-2324; L-15780; NAS 1.60:2324) Avail: NTIS HC A02/MF A01 CSCL 20K

ADHESIVE BONDING, COMPOSITE MATERIALS, FATIGUE LIFE, LAP JOINTS, PREFORMS

**N84-31688\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**NONLINEAR STRUCTURAL ANALYSIS**

Washington Jun. 1984 168 p Workshop held in Cleveland, 19-20 Apr. 1983

(NASA-CP-2297; E-1903; NAS 1.55:2297) Avail: NTIS HC A08/MF A01 CSCL 20K

BOUNDARY ELEMENT METHOD, CONFERENCES, FINITE ELEMENT METHOD, FRACTURES (MATERIALS), GAS TURBINE ENGINES, INELASTIC STRESS, LAMINATES, NONLINEAR SYSTEMS, SHELLS (STRUCTURAL FORMS), STRESS ANALYSIS, STRUCTURAL ANALYSIS

**N84-32864\*#** Computer Software Management and Information Center, Athens, Ga.

**TWELFTH NASTRAN USERS' COLLOQUIUM**

Washington Aug. 1984 261 p refs Colloq. held in Orlando, Fla., 7-11 May 1984 Prepared in cooperation with Georgia Univ., Athens

(NASA-CP-2328; NAS 1.55:2328) Avail: NTIS HC A12/MF A01 CSCL 20K

COMPUTER TECHNIQUES, CONFERENCES, FINITE ELEMENT METHOD, NASTRAN, STRUCTURAL ANALYSIS

**N84-33832\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A FORMULATION OF ROTOR-AIRFRAME COUPLING FOR DESIGN ANALYSIS OF VIBRATIONS OF HELICOPTER AIRFRAMES**

R. G. KVATERNIK and W. C. WALTON, JR. Jun. 1982 135 p refs

(NASA-RP-1089; L-14243; NAS 1.61:1089) Avail: NTIS HC A07/MF A01 CSCL 01C

A linear formulation of rotor airframe coupling intended for vibration analysis in airframe structural design is presented. The airframe is represented by a finite element analysis model; the rotor is represented by a general set of linear differential equations with periodic coefficients; and the connections between the rotor and airframe are specified through general linear equations of constraint. Coupling equations are applied to the rotor and airframe equations to produce one set of linear differential equations governing vibrations of the combined rotor airframe system. These equations are solved by the harmonic balance method for the system steady state vibrations. A feature of the solution process is the representation of the airframe in terms of forced responses calculated at the rotor harmonics of interest. A method based on matrix partitioning is worked out for quick recalculations of vibrations in design studies when only relatively few airframe members are varied. All relations are presented in forms suitable for direct computer implementation. E.A.K.

**N84-34773\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MIXED MODELS AND RECUGION TECHNIQUES FOR LARGE-ROTATION, NONLINEAR ANALYSIS OF SHELLS OF REVOLUTION WITH APPLICATION TO TIRES**

A. K. NOOR (George Washington Univ.), C. M. ANDERSEN (Coll. of William and Mary), and J. A. TANNER Oct. 1984 57 p refs

(NCC1-40)

(NASA-TP-2343; L-15802; NAS 1.60:2343) Avail: NTIS HC A04/MF A01 CSCL 20K

DEFORMATION, ROTATION, SERIES EXPANSION, SHELLS (STRUCTURAL FORMS), STRESS ANALYSIS, TIRES

## 39 STRUCTURAL MECHANICS

**N85-10377\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### RESEARCH IN STRUCTURES AND DYNAMICS, 1984

R. J. HAYDUK, comp. and A. K. NOOR, comp. (George Washington Univ.) Washington Oct. 1984 416 p refs Conf. held in Washington, D.C., 22-25 Oct. 1984 Sponsored in cooperation with NSF, AFOSR, AIAA, the American Society of Mechanical Engineers, and the American Society of Civil Engineers (NASA-CP-2335; L-15866; NAS 1.55:2335) Avail: NTIS HC A18/MF A01 CSCL 20K

COMPUTATION, COMPUTER PROGRAMMING, COMPUTER TECHNIQUES, CONTROL THEORY, DYNAMIC STRUCTURAL ANALYSIS, PROBLEM SOLVING

**N85-10405\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### VIBRATION, ACOUSTIC, AND SHOCK DESIGN AND TEST CRITERIA FOR COMPONENTS ON THE SOLID ROCKET BOOSTERS (SRB), LIGHTWEIGHT EXTERNAL TANK (LWT), AND SPACE SHUTTLE MAIN ENGINES (SSME)

Sep. 1984 812 p  
(NASA-RP-1127; NAS 1.61:1127) Avail: NTIS HC A99/MF A01 CSCL 20K

The vibration, acoustics, and shock design and test criteria for components and subassemblies on the space shuttle solid rocket booster (SRB), lightweight tank (LWT), and main engines (SSME) are presented. Specifications for transportation, handling, and acceptance testing are also provided. R.S.F.

**N85-11378\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### STARS: A GENERAL-PURPOSE FINITE ELEMENT COMPUTER PROGRAM FOR ANALYSIS OF ENGINEERING STRUCTURES

K. K. GUPTA Oct. 1984 68 p refs  
(NASA-RP-1129; H-1224; NAS 1.61:1129) Avail: NTIS HC A04/MF A01 CSCL 20K

STARS (Structural Analysis Routines) is primarily an interactive, graphics-oriented, finite-element computer program for analyzing the static, stability, free vibration, and dynamic responses of damped and undamped structures, including rotating systems. The element library consists of one-dimensional (1-D) line elements, two-dimensional (2-D) triangular and quadrilateral shell elements, and three-dimensional (3-D) tetrahedral and hexahedral solid elements. These elements enable the solution of structural problems that include truss, beam, space frame, plane, plate, shell, and solid structures, or any combination thereof. Zero, finite, and interdependent deflection boundary conditions can be implemented by the program. The associated dynamic response analysis capability provides for initial deformation and velocity inputs, whereas the transient excitation may be either forces or accelerations. An effective in-core or out-of-core solution strategy is automatically employed by the program, depending on the size of the problem. Data input may be at random within a data set, and the program offers certain automatic data-generation features. Input data are formatted as an optimal combination of free and fixed formats. Interactive graphics capabilities enable convenient display of nodal deformations, mode shapes, and element stresses. R.J.F.

**N85-13267\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### FULL-SCALE CRASH-TEST EVALUATION OF TWO LOAD-LIMITING SUBFLOORS FOR GENERAL AVIATION AIRFRAMES

H. D. CARDEN Dec. 1984 60 p refs  
(NASA-TP-2380; L-15764; NAS 1.60:2380) Avail: NTIS HC A04/MF A01 CSCL 20K

AIRFRAME MATERIALS, CRASHWORTHINESS, FLOORS, GENERAL AVIATION AIRCRAFT, IMPACT TESTS, SUBSTRUCTURES

**N85-20396\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### LOCAL STRAIN REDISTRIBUTION CORRECTIONS FOR A SIMPLIFIED INELASTIC ANALYSIS PROCEDURE BASED ON AN ELASTIC FINITE-ELEMENT ANALYSIS

A. KAUFMAN and S. Y. HWANG (South Carolina State Coll., Orangeburg) Mar. 1985 14 p refs To be presented at the 21st AIAA/SAE/ASME Joint Propulsion Conf., Monterey, Calif., 8-11 Jul. 1985

(NASA-TP-2421; E-2373; NAS 1.60:2421) Avail: NTIS HC A02/MF A01 CSCL 20K

CYCLIC LOADS, FINITE ELEMENT METHOD, INELASTIC STRESS, NONLINEAR EQUATIONS, STRESS CONCENTRATION, STRESS-STRAIN RELATIONSHIPS

**N85-25863\*#** Computer Software Management and Information Center, Athens, Ga.

### THIRTEENTH NASTRAN USERS' COLLOQUIUM

May 1985 469 p refs Colloq. held in Boston, 6-10 May 1985 Original contains color illustrations

(NASA-CP-2373; NAS 1.55:2373) Avail: NTIS HC A20/MF A01; also available from COSMIC, Athens, Ga. CSCL 20K

CONFERENCES, FINITE ELEMENT METHOD, NASTRAN, STRUCTURAL ANALYSIS

**N85-27258\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### NONLINEAR EQUATIONS FOR DYNAMICS OF PRETWISTED BEAMS UNDERGOING SMALL STRAINS AND LARGE ROTATIONS

D. H. HODGES May 1985 35 p refs Prepared in cooperation with Army Research and Technology Labs.

(NASA-TP-2470; A-9833; NAS 1.60:2470; AVSCOM-TR-84-A-5) Avail: NTIS HC A03/MF A01 CSCL 20K

BEAMS (SUPPORTS), DEFORMATION, DYNAMIC STRUCTURAL ANALYSIS, KINEMATICS, ROTATING BODIES

**N85-31530\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### NONLINEAR CONSTITUTIVE RELATIONS FOR HIGH TEMPERATURE APPLICATION, 1984

Jun. 1985 368 p refs Symp. held in Cleveland, 15-17 Jun. 1984

(NASA-CP-2369; E-2368; NAS 1.55:2369) Avail: NTIS HC A16/MF A01 CSCL 20K

CONFERENCES, CONSTITUTIVE EQUATIONS, HIGH TEMPERATURE TESTS, NONLINEARITY, TEMPERATURE EFFECTS, VISCOPLASTICITY

**N85-32339\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### A CRACKED ORTHOTROPIC SHEET STIFFENED BY A SEMI-INFINITE ORTHOTROPIC SHEET

C. A. BIGELOW Washington Jul. 1985 26 p refs  
(NASA-TP-2455; L-15972; NAS 1.60:2455) Avail: NTIS HC A02/MF A01 CSCL 20K

ADHESIVE BONDING, ALGEBRA, COMPOSITE MATERIALS, CRACK INITIATION, CRACK PROPAGATION, CRACK TIPS, GREEN'S FUNCTIONS, HOMOGENEITY, INTEGRAL EQUATIONS, ORTHOTROPIC PLATES, PLANE STRAIN, SHEAR STRESS, SPECIMEN GEOMETRY, STRESS INTENSITY FACTORS, STRINGERS

**N85-33512\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### NINETEENTH AEROSPACE MECHANISMS SYMPOSIUM

Aug. 1985 389 p refs Symp. held at Moffett Field, Calif., 1-3 May 1985; sponsored by NASA, Washington, D.C., California Inst. of Tech., Pasadena, and LMSC, Sunnyvale, Calif.

(NASA-CP-2371; REPT-85181; NAS 1.55:2371) Avail: NTIS HC A17/MF A01 CSCL 20K

AERODYNAMICS, AEROSPACE SYSTEMS, CONFERENCES, MECHANICAL DRIVES

**N85-33537\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**JOINT DESIGN FOR IMPROVED FATIGUE LIFE OF DIFFUSION-BONDED BOX-STIFFENED PANELS**

R. C. DAVIS, P. L. MOSES (PRC Kentron, Inc.), and R. S. KANENKO (Lockheed California Co., Burbank) Washington Sep. 1985 18 p refs

(NASA-TP-2480; L-15967; NAS 1.60:2480) Avail: NTIS HC

A02/MF A01 CSCL 20K

DIFFUSION WELDING, FATIGUE LIFE, PANELS, RIGID STRUCTURES, TITANIUM

**N86-10579\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**JOINT RESEARCH EFFORT ON VIBRATIONS OF TWISTED PLATES, PHASE 1: FINAL RESULTS**

R. E. KIELB, A. W. LEISSA, J. C. MACBAIN, and K. S. CARNEY Washington Sep. 1985 100 p refs

(NASA-RP-1150; E-2576; NAS 1.61:1150) Avail: NTIS HC

A05/MF A01 CSCL 20K

The complete theoretical and experimental results of the first phase of a joint government/industry/university research study on the vibration characteristics of twisted cantilever plates are given. The study is conducted to generate an experimental data base and to compare many different theoretical methods with each other and with the experimental results. Plates with aspect ratios, thickness ratios, and twist angles representative of current gas turbine engine blading are investigated. The theoretical results are generated by numerous finite element, shell, and beam analysis methods. The experimental results are obtained by precision matching a set of twisted plates and testing them at two laboratories. The second and final phase of the study will concern the effects of rotation. Author

**N86-11495\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TURBINE ENGINE HOT SECTION TECHNOLOGY (HOST)**

Oct. 1983 250 p refs Workshop held in Cleveland, Ohio, 25-26 Oct. 1983

(NASA-CP-2289; E-1816; NAS 1.55:2289) Avail: NTIS HC

A11/MF A01 CSCL 21E

COMBUSTION, ENGINE PARTS, FAILURE ANALYSIS, FATIGUE (MATERIALS), GAS TURBINE ENGINES, HEAT TRANSMISSION, HIGH TEMPERATURE, OPERATING TEMPERATURE, PROTECTIVE COATINGS, STRUCTURAL ANALYSIS

**N86-11522\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A STUDY OF THE CORNERING FORCES GENERATED BY AIRCRAFT TIRES ON A TILTED, FREE-SWIVELING NOSE GEAR**

R. H. DAUGHERTY and S. M. STUBBS Oct. 1985 30 p refs

(NASA-TP-2481; L-15954; NAS 1.60:2481) Avail: NTIS HC

A03/MF A01 CSCL 20K

AIRCRAFT TIRES, ATTITUDE (INCLINATION), FORCE DISTRIBUTION, GEARS, NOSE WHEELS, SLOPES

**N86-20856\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN APPROXIMATE BUCKLING ANALYSIS FOR RECTANGULAR ORTHOTROPIC PLATES WITH CENTRALLY LOCATED CUTOUTS**

M. P. NEMETH, M. STEIN, and E. R. JOHNSON (Virginia Polytechnic Inst. and State Univ., Blacksburg, Va.) Feb. 1986 21 p refs

(NASA-TP-2528; L-16032; NAS 1.60:2528) Avail: NTIS HC

A02/MF A01 CSCL 20K

BUCKLING, DISPLACEMENT, OPENINGS, ORTHOTROPIC PLATES, PREDICTION ANALYSIS TECHNIQUES

**N86-20857\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SOLUTION OF THE SYMMETRIC EIGENPROBLEM  $AX = \lambda BX$  BY DELAYED DIVISION**

G. A. THURSTON and N. J. C. BAINS Mar. 1986 40 p refs

(NASA-TP-2514; L-15984; NAS 1.60:2514) Avail: NTIS HC

A03/MF A01 CSCL 20K

DIVIDING (MATHEMATICS), EIGENVALUES, ITERATIVE SOLUTION, SYMMETRY

**N86-21933\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FULL-SCALE TRANSPORT CONTROLLED IMPACT DEMONSTRATION**

R. J. HAYDUK, comp. Jan. 1986 356 p refs Workshop held in Hampton, Va., 10 Apr. 1985; sponsored by NASA. Langley Research Center and FAA

(NASA-CP-2395; L-16048; NAS 1.55:2395) Avail: NTIS HC

A16/MF A01 CSCL 20K

AIRCRAFT ACCIDENTS, AIRCRAFT FUELS, AIRCRAFT STRUCTURES, ANTIMISTING FUELS, CONFERENCES, CRASHES, CRASHWORTHINESS, DATA ACQUISITION, IMPACT TESTS, KEROSENE, REMOTELY PILOTED VEHICLES

**N86-23974\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**POCKETING MECHANICS OF SRM NOZZLE LINER**

V. S. VERDERAIME 1986 27 p refs

(NASA-TP-2577; NAS 1.60:2577) Avail: NTIS HC A03/MF A01

CSCL 20K

COMPOSITE MATERIALS, HOT CORROSION, NOZZLE INSERTS, SOLID PROPELLANT ROCKET ENGINES

**N86-25823\*#** Computer Software Management and Information Center, Athens, Ga.

**FOURTEENTH NASTRAN USERS' COLLOQUIUM**

May 1986 337 p refs Colloquium held in San Diego, Calif. 5-9 May 1986

(NASW-3247)

(NASA-CP-2419; NAS 1.55:2419) Avail: NTIS HC A15/MF A01;

also available from COSMIC, Athens, Ga. CSCL 20K

DESIGN ANALYSIS, DYNAMIC STRUCTURAL ANALYSIS, FINITE ELEMENT METHOD, NASTRAN, STRUCTURAL STABILITY

**N86-28464\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMAL-FATIGUE AND OXIDATION RESISTANCE OF COBALT-MODIFIED UDIMET 700 ALLOY**

P. T. BIZON and B. J. BARROW Apr. 1986 15 p

(NASA-TP-2591; E-2704; NAS 1.60:2591) Avail: NTIS HC

A02/MF A01 CSCL 20K

COBALT, FATIGUE LIFE, HEAT RESISTANT ALLOYS, NICKEL ALLOYS, OXIDATION, PROTECTIVE COATINGS, THERMAL FATIGUE, UDIMET ALLOYS

## GEOSCIENCES (GENERAL)

**N77-30521\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TERRESTRIAL PHOTOVOLTAIC MEASUREMENTS, 2**

1976 393 p refs Workshop held at Baton Rouge, La., 10-12 Nov. 1976; sponsored by NASA and ERDA (NASA-CP-2010; ERDA/NASA-1022/76/10) Avail: NTIS HC A17/MF A01 CSCL 10A

PHOTOVOLTAIC CELLS, SCHOTTKY DIODES, SOLAR RADIATION, SOLAR SIMULATION, SPECTRAL ENERGY DISTRIBUTION

**N77-32549\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**NASA WORKSHOP ON SOLAR-TERRESTRIAL STUDIES FROM A MANNED SPACE STATION**

1977 42 p refs Workshop held at Logan, Utah, 14-16 Feb. 1977

(NASA-CP-2024) Avail: NTIS HC A03/MF A01 CSCL 04A

ATMOSPHERIC PHYSICS, MEASURING INSTRUMENTS, RADIATION EFFECTS, SOLAR RADIATION

**N78-33499\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**DISCRIMINATION OF ROCK CLASSES AND ALTERATION PRODUCTS IN SOUTHWESTERN SAUDI ARABIA WITH COMPUTER-ENHANCED LANDSAT DATA**

H. W. BLODGET, F. J. GUNTHER (Computer Sciences Corp., Silver Spring, Md.), and M. H. PODWYSOCKI Oct. 1978 40 p refs

(NASA-TP-1327; G7802-F16) Avail: NTIS HC A03/MF A01

CSCL 08G

GEOLOGICAL SURVEYS, LANDSAT SATELLITES, ROCKS, SAUDI ARABIA

**N79-17279\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**SKYLAB EREP INVESTIGATIONS SUMMARY**

W. J. PIERSON, ed. (City Univ. of New York) Washington 1978 387 p refs Original contains color illustrations (NASA-SP-399) Avail: NTIS MF A01; SOD HC CSCL 05B

The problems in the areas of agriculture, range and forestry; land use and cartography; geology and hydrology; oceans atmosphere, and data analysis techniques were investigated and summarized using Earth Resources Experiment Package (EREP) data. For individual titles, see N79-17280 through N79-17287.

**N79-20424\*#** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

**PROCEEDINGS OF THE NASA/FLORIDA INSTITUTE OF TECHNOLOGY ENVIRONMENTAL ENGINEERING CONFERENCE ON NITROGEN TETROXIDE**

E. L. RHODES Jun. 1978 203 p refs Conf. held at Melbourne, Fla., 30-31 Mar. 1978

(NASA-CP-2049) Avail: NTIS HC A10/MF A01 CSCL 13B

CONFERENCES, HYPERGOLIC ROCKET PROPELLANTS, NITROGEN TETROXIDE, ROCKET OXIDIZERS, SPACE SHUTTLES

**N79-22580\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A COUPLED RADIATIVE-CONVECTIVE-PHOTOCHEMICAL MODEL OF THE STRATOSPHERE**

R. E. BOUGHNER and J. E. NEALY Apr. 1979 48 p refs (NASA-TP-1418; L-12659) Avail: NTIS HC A03/MF A01

CSCL 04A

ATMOSPHERIC CHEMISTRY, GEOPHYSICS, STRATOSPHERE

**N79-23461\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**STRATCOM 8 DATA WORKSHOP AND SUPPLEMENT**

E. L. REED, comp. Apr. 1978 137 p refs Workshop held at Greenbelt, Md., 13-14 Apr. 1978 and presented at the Spring Meeting of the Am. Geophys. Union, Miami Beach, Fla., 17-21 Apr. 1978

(NASA-CP-2043) Avail: NTIS HC A07/MF A01 CSCL 04A

ATMOSPHERIC COMPOSITION, METEOROLOGICAL BALLOONS, STRATOSPHERE

**N80-15445\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**BAROCLINIC INSTABILITY WITH VARIABLE GRAVITY: A PERTURBATION ANALYSIS**

A. C. GIERE (Univ. Space Res. Assoc.), W. W. FOWLIS, and S. ARIAS Jan. 1980 30 p refs

(NASA-TP-1586; M-293) Avail: NTIS HC A03/MF A01 CSCL 08G

BAROCLINITY, GRAVITATIONAL EFFECTS, PERTURBATION THEORY

**N81-32564\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**FIELD STUDY FOR REMOTE SENSING: AN INSTRUCTOR'S MANUAL**

W. H. WAKE, ed. (California State Coll., Bakersfield) and G. A. HULL, ed. 1981 93 p refs Proceedings of the LANDSAT C Educator's/User's Workshop, Santa Maria, Calif., 2-4 Mar. 1978; sponsored by the National Council for Geographic Education and Univ. of Western Illinois, Macomb

(NASA-CP-2155; A-8336; LC-78-61696) Avail: NTIS HC A05/MF A01 CSCL 05I

CONFERENCES, EDUCATION, GROUND TRUTH, PHOTOINTERPRETATION, REMOTE SENSING, TECHNOLOGY TRANSFER

**N83-11534\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ATMOSPHERIC EFFECTS AND POTENTIAL CLIMATIC IMPACT OF THE 1980 ERUPTIONS OF MOUNT ST. HELENS**

A. DEEPAK, ed. Washington Oct. 1982 296 p refs Symp. held at Washington, D.C., 18-19 Nov. 1980

(NASA-CP-2240; L-15488; NAS 1.55:2240) Avail: NTIS HC A13/MF A01 CSCL 04B

AEROSOLS, AIR POLLUTION, ATMOSPHERIC EFFECTS, CLIMATE, ECOSYSTEMS, ENVIRONMENT EFFECTS, VOLCANOES, WATER QUALITY

**N84-18716\*#** Science Applications, Inc., McLean, Va.

**SPACEBORNE GRAVITY GRADIOMETERS**

W. C. WELLS, ed. Mar. 1984 82 p refs Workshop held in Greenbelt, Md., 28 Feb. - 2 Mar. 1983

(NASW-3622)

(NASA-CP-2305; NAS 1.55:2305) Avail: NTIS HC A05/MF A01 CSCL 14B

CONFERENCES, GEOPOTENTIAL, GEOPOTENTIAL RESEARCH MISSION, GRAVITY GRADIOMETERS, PLANETARY GRAVITATION, SATELLITE-BORNE INSTRUMENTS

## 43 EARTH RESOURCES AND REMOTE SENSING

**N84-28131\*#** National Aeronautics and Space Administration, Washington, D.C.

### **PROCEEDINGS OF A WORKSHOP ON RESEARCH NEEDS IN HETEROGENEOUS TROPOSPHERIC CHEMISTRY**

1983 83 p refs Workshop held in Sarasota, Fla., 9-13 Jan. 1984

(NASA-CP-2320; L-15801; NAS 1.55:2320) Avail: NTIS HC A05/MF A01 CSCL 04A

ATMOSPHERIC CHEMISTRY, ATMOSPHERIC CIRCULATION, ATMOSPHERIC MODELS, CLOUD PHYSICS, RESEARCH MANAGEMENT, TROPOSPHERE

**N84-30359\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **LANDSAT-4 SCIENCE INVESTIGATIONS SUMMARY, INCLUDING DECEMBER 1983 WORKSHOP RESULTS, VOLUME 1**

J. L. BARKER, ed. Jul. 1984 213 p refs Proc. of LANDSAT-4 Early Results Symp., held in Greenbelt, Md., 22-24 Feb. 1983 and LANDSAT Sci. Characterization Workshop, held in Greenbelt, Md., 6 Dec. 1983 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 2 Vol.

(E84-10166; NASA-CP-2326-VOL-1; NAS 1.55:2326-VOL-1)

Avail: NTIS HC A10/MF A01 CSCL 08B

CALIBRATING, DATA CORRELATION, IMAGE PROCESSING, LANDSAT 4, RADIOMETRIC CORRECTION, SATELLITE IMAGERY, THEMATIC MAPPING

**N84-30380\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **LANDSAT-4 SCIENCE INVESTIGATIONS SUMMARY, INCLUDING DECEMBER 1983 WORKSHOP RESULTS, VOLUME 2**

J. L. BARKER, ed. Jul. 1984 188 p refs Proc. of the LANDSAT-4 Early Results Symp., held in Greenbelt, Md., 22-24 Feb. 1983 and LANDSAT Sci. Characterization Workshop, held in Greenbelt, Md., 6 Dec. 1983 ERTS 2 Vol.

(E84-10167; NASA-CP-2326-VOL-2; NAS 1.55:2326-VOL-2)

Avail: NTIS HC A09/MF A01 CSCL 08B

GEOMETRIC ACCURACY, IMAGE PROCESSING, IMAGING TECHNIQUES, LANDSAT 4, RADIOMETRIC CORRECTION, RADIOMETRIC RESOLUTION, SPATIAL RESOLUTION, THEMATIC MAPPING

**N84-30475\*#** National Aeronautics and Space Administration, Washington, D.C.

### **GEODYNAMICS**

L. S. WALTER Jul. 1984 61 p Workshop held in Airlie, Va., 15-18 Feb. 1983

(NASA-CP-2325; NAS 1.55:2325) Avail: NTIS HC A04/MF A01 CSCL 08G

CONFERENCES, GEODESY, GEODYNAMICS, GEOMAGNETISM, GEOPOTENTIAL, TECTONICS

**N85-23112\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **OZONE CORRELATIVE MEASUREMENTS WORKSHOP**

E. HILSENATH, ed. Washington Mar. 1985 75 p refs Workshop held in Greenbelt, Md., 16-18 Nov. 1983

(NASA-CP-2362; REPT-85B0183; NAS 1.55:2362) Avail: NTIS HC A04/MF A01 CSCL 04A

DATA CORRELATION, OZONE, REGRESSION ANALYSIS, ULTRAVIOLET SPECTROMETERS, VARIABILITY

**N85-32357\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **GLOBAL MEGA-GEOMORPHOLOGY**

R. S. HAYDEN, ed. (George Mason Univ., Fairfax, Va.) Jul. 1985 130 p refs Workshop held in Oracle, Ariz., 14-16 Jan. 1985; sponsored by NASA and the International Union of Geological Sciences

(NASA-CP-2312; REPT-85B0472; NAS 1.55:2312) Avail: NTIS HC A07/MF A01 CSCL 08G

GEOCHEMISTRY, GEOCHRONOLOGY, GEOLOGY, GEOMORPHOLOGY, GEOPHYSICS, LANDFORMS, OCEANS, PALEONTOLOGY, STRUCTURAL PROPERTIES (GEOLOGY), TECTONICS, TOPOLOGY

**N86-29282\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **PROCEEDINGS OF THE SECOND PILOT CLIMATE DATA SYSTEM WORKSHOP**

1986 268 p Workshop held in Greenbelt, Md., 29-30 Jan. 1986

(NASA-CP-2430; NAS 1.55:2430) Avail: NTIS HC A12/MF A01 CSCL 04B

CLIMATE, COMPUTER NETWORKS, CONFERENCES, DATA ACQUISITION, DATA MANAGEMENT, DATA RETRIEVAL, DATA SYSTEMS, INFORMATION SYSTEMS, ON-LINE SYSTEMS

**N86-29301\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **THERMOSPHERE DYNAMICS WORKSHOP, VOLUME 2**

H. G. MAYR, ed. and N. J. MILLER, ed. Jun. 1986 461 p Workshop held in Beltsville and Calverton, Md., 3-5 Oct. 1984 Original contains color illustrations

(NASA-CP-2389; REPT-85B0268; NAS 1.55:2389) Avail: NTIS HC A20/MF A01 CSCL 04A

ATMOSPHERIC COMPOSITION, AURORAL ZONES, CONVECTIVE FLOW, ELECTRIC FIELDS, PHOTOIONIZATION, THERMOSPHERE

## 43

## EARTH RESOURCES AND REMOTE SENSING

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

**N78-15549\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

### **PROCEDURES FOR GATHERING GROUND TRUTH INFORMATION FOR A SUPERVISED APPROACH TO A COMPUTER-IMPLEMENTED LAND COVER CLASSIFICATION OF LANDSAT-ACQUIRED MULTISPECTRAL SCANNER DATA**

A. T. JOYCE 1978 48 p refs

(NASA-RP-1015; JSC-12910; S-478) Avail: NTIS HC A03/MF A01 CSCL 08F

Procedures for gathering ground truth information for a supervised approach to a computer-implemented land cover classification of LANDSAT acquired multispectral scanner data are provided in a step by step manner. Criteria for determining size, number, uniformity, and predominant land cover of training sample sites are established. Suggestions are made for the organization and orientation of field team personnel, the procedures used in the field, and the format of the forms to be used. Estimates are made of the probable expenditures in time and costs. Examples of ground truth forms and definitions and criteria of major land cover categories are provided in appendixes. Author

## 43 EARTH RESOURCES AND REMOTE SENSING

**N78-18497\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**ANALYSIS OF DATA SYSTEMS REQUIREMENTS FOR GLOBAL CROP PRODUCTION FORECASTING IN THE 1985 TIME FRAME**

S. W. DOWNS, P. A. LARSEN, and D. A. GERSTNER Feb. 1978 48 p refs  
 (NASA-TP-1164; M-248) Avail: NTIS HC A03/MF A01 CSCL 02C

CROP GROWTH, DATA SYSTEMS, TECHNOLOGICAL FORECASTING, USER REQUIREMENTS

**N78-21526\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**APPLICATION OF REMOTE SENSING TO THE CHESAPEAKE BAY REGION. VOLUME 2: PROCEEDINGS**

W. T. CHEN, ed., G. W. FREAS, JR., ed., G. D. HICKMAN, ed. (Maryland Univ., College Park), D. A. PEMBERTON, ed. (Maryland Univ., College Park), T. D. WILKERSON, ed. (Maryland Univ., College Park), I. ADLER, ed. (Maryland Univ., College Park), and V. J. LAURIE, ed. (EPA, Washington, D.C.) Feb. 1978 388 p refs Conf. held at Berkeley Springs, W. Va., 12-15 Apr. 1977; sponsored by NASA, EPA, and Maryland Univ., College Park (NASA-CP-006-PT-2; G-7719-2) Avail: NTIS HC A17/MF A01 CSCL 08J

CHESAPEAKE BAY (US), CONFERENCES, ENVIRONMENTAL SURVEYS, REMOTE SENSORS

**N78-21562\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**ACTIVE MICROWAVE USERS WORKSHOP REPORT**

R. E. MATTHEWS, ed. 1978 300 p refs Conf. held at Houston, Tex., Aug. 1976  
 (NASA-CP-2030; S-476) Avail: NTIS HC A13/MF A01 CSCL 14B

CONFERENCES, EARTH RESOURCES PROGRAM, MICROWAVE IMAGERY, REMOTE SENSORS, SATELLITE-BORNE INSTRUMENTS

**N78-21568\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**THE USE OF LANDSAT DIGITAL DATA AND COMPUTER-IMPLEMENTED TECHNIQUES FOR AN AGRICULTURAL APPLICATION**

A. T. JOYCE (NASA, Earth Resources Lab., Slidell, La.) and R. H. GRIFFIN, II (NASA, Earth Resources Lab., Slidell, La.) Jan. 1978 48 p refs Original contains color illustrations (NASA-RP-1016; JSC-12897; S-477) Avail: NTIS HC A03/MF A01 CSCL 02C

Agricultural applications procedures are described for use of LANDSAT digital data and other digitalized data (e.g., soils). The results of having followed these procedures are shown in production estimates for cotton and soybeans in Washington County, Mississippi. Examples of output products in both line printer and map formats are included, and a product adequacy assessment is made. Author

**N78-23537\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**APPLICATION OF REMOTE SENSING TO THE CHESAPEAKE BAY REGION. VOLUME 1: EXECUTIVE SUMMARY**

W. T. CHEN, G. W. FREAS, JR., G. D. HICKMAN (Maryland Univ., College Park), D. A. PEMBERTON (Maryland Univ., College Park), T. D. WILKERSON (Maryland Univ., College Park), I. ADLER (Maryland Univ., College Park), and V. J. LAURIE (EPA, Washington, D. C.) 1978 47 p Conf. held at Berkeley Springs, W. Va., 12-15 Apr. 1977; sponsored by NASA, EPA, and Maryland Univ., College Park (NASA-CP-006-PT-1; G-7719-1) Avail: NTIS HC A03/MF A01 CSCL 08C

CHESAPEAKE BAY (US), CONFERENCES, REMOTE SENSORS

**N78-23538\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**DIELECTRIC CONSTANTS OF SOILS AT MICROWAVE FREQUENCIES-2**

J. WANG, T. SCHMUGGE, and D. WILLIAMS May 1978 34 p refs  
 (NASA-TP-1238; G-7802-13) Avail: NTIS HC A03/MF A01 CSCL 20N

MICROWAVE FREQUENCIES, PERMITTIVITY, SOIL MOISTURE, SOIL SCIENCE

**N78-31508\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**HIGH ALTITUDE PERSPECTIVE**

1978 33 p Original contains color illustrations  
 (NASA-SP-427) Avail: NTIS MF A01; SOD HC \$1.60 CSCL 14E

The capabilities of the NASA Ames Center U-2 aircraft for research or experimental programs are described for such areas as Earth resources inventories; remote sensing data interpretation; electronic sensor research and development; satellite investigative support; stratospheric gas studies; and astronomy and astrophysics. The availability of this aircraft on a cost-reimbursable basis for use in high-altitude investigations that cannot be performed by the private sector is discussed. A.R.H.

**N79-13475\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**EULUSMAP: AN INTERNATIONAL LAND RESOURCES MAP UTILIZING SATELLITE IMAGERY**

T. PALUDAN and E. CSATI (Inst. of Surveying and Mapping, Budapest) Dec. 1978 20 p refs  
 (NASA-TP-1371; M-271) Avail: NTIS HC A02/MF A01 CSCL 08B

IMAGERY, LAND, MAPS, MULTISPECTRAL PHOTOGRAPHY

**N79-16329\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**SOIL MOISTURE WORKSHOP**

J. L. HEILMAN, ed. (South Dakota State Univ.), D. G. MOORE, ed. (South Dakota State Univ.), T. J. SCHMUGGE, ed., and D. B. FRIEDMAN, ed. Nov. 1978 219 p refs Workshop held at Beltsville, Md., 17-19 Jan. 1978; sponsored in part by NASA and the US Dept. of Agriculture (NASA-CP-2073) Avail: NTIS HC A10/MF A01 CSCL 08M

CONFERENCES, MOISTURE CONTENT, MOISTURE METERS, SOIL MOISTURE

**N80-10537\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**EDUCATOR'S GUIDE FOR MISSION TO EARTH: LANDSAT VIEWS THE WORLD**

M. A. TINDAL 1978 56 p refs Original contains color illustrations  
 (NASA-SP-360) Avail: NTIS MF A01, SOD HC CSCL 08B

This teacher's guide is specifically designed to provide information and suggestions for using LANDSAT imagery to teach basic concepts in several content areas. Content areas include: (1) Earth science and geology; (2) environmental studies; (3) geography; and (4) social and urban studies. R.E.S.

**N80-10538\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**APOLLO-SOYUZ TEST PROJECT. VOLUME 2: EARTH OBSERVATIONS AND PHOTOGRAPHY**

F. EL-BAZ, ed. (Smithsonian Institution) and D. M. WARNER, ed. (Smithsonian Institution) Washington 1979 700 p refs Original contains color illustrations 2 Vol.  
 (NAS9-13831)

(NASA-SP-412-VOL-2) Avail: NTIS HC A99/MF A01 CSCL 05B

Visual observations of the earth are presented along with the

## 43 EARTH RESOURCES AND REMOTE SENSING

corresponding photographs and maps for specific regions. For individual titles, see N80-10539 through N80-10581.

**N80-15535\*#** National Aeronautics and Space Administration. Earth Resources Lab., Bay St. Louis, Miss.

### **DEMONSTRATION OF WETLAND VEGETATION MAPPING IN FLORIDA FROM COMPUTER-PROCESSED SATELLITE AND AIRCRAFT MULTISPECTRAL SCANNER DATA**

M. K. BUTERA Oct. 1979 27 p refs  
(NASA-TP-1553; S-492) Avail: NTIS HC A03/MF A01 CSCL 08B

MAPPING, MULTISPECTRAL BAND SCANNERS, VEGETATION, WETLANDS

**N80-16405\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

### **SYNTHETIC APERTURE RADAR/LANDSAT MSS IMAGE REGISTRATION**

H. E. MAURER, ed., J. D. OBERHOLTZER, ed., and P. E. ANUTA, ed. (Purdue Univ.) Jun. 1979 233 p Original contains color illustrations

(NAS6-2816; NAS6-2827)

(NASA-RP-1039) Avail: NTIS HC A11/MF A01 CSCL 17I

Algorithms and procedures necessary to merge aircraft synthetic aperture radar (SAR) and LANDSAT multispectral scanner (MSS) imagery were determined. The design of a SAR/LANDSAT data merging system was developed. Aircraft SAR images were registered to the corresponding LANDSAT MSS scenes and were the subject of experimental investigations. Results indicate that the registration of SAR imagery with LANDSAT MSS imagery is feasible from a technical viewpoint, and useful from an information-content viewpoint. J.M.S.

**N80-25742\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **OPERATIONAL APPLICATIONS OF SATELLITE SNOWCOVER OBSERVATIONS**

A. RANGO, ed. and R. PETERSON, ed. (GE, Beltsville, Md.) May 1980 294 p refs Workshop held at Sparks, Nev., 16-17 Apr. 1979; sponsored in part by Nevada Univ. Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(E80-10167; NASA-CP-2116) Avail: NTIS HC A13/MF A01 CSCL 08L

CONFERENCES, HYDROLOGY, IMAGE PROCESSING, MOUNTAINS, RESOURCES MANAGEMENT, RIVER BASINS, SNOW COVER, TECHNOLOGY UTILIZATION, THEMATIC MAPPING, WATER RUNOFF, WATERSHEDS

**N80-28798\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **RADIO INTERFEROMETRY: TECHNIQUES FOR GEODESY**

Jul. 1980 474 p refs Conf. held in Cambridge and Westford, Mass., 19-21 Jun. 1979

(NASA-CP-2115) Avail: NTIS HC A20/MF A01 CSCL 08E

CONFERENCES, GEODESY, GEOPHYSICS, INTERFEROMETRY

**N81-11438\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

### **NASA WALLOPS FLIGHT CENTER GEOS-3 ALTIMETER DATA PROCESSING REPORT**

H. R. STANLEY and R. E. DWYER (Computer Sciences Corp., Wallops Island, Va.) Nov. 1980 131 p refs Supersedes NASA-TM-X-69357

(NASA-RP-1066) Avail: NTIS HC A07/MF A01 CSCL 17I

The procedures used to process the GEOS-3 radar altimeter data from raw telemetry data to a final user data product are described. In addition, the radar altimeter hardware design and operating parameters are presented to aid the altimeter user in understanding the altimeter data. Author

**N81-19511\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **MICROWAVE REMOTE SENSING OF SNOWPACK PROPERTIES**

A. RANGO, ed. 1980 272 p refs Conf. held at Fort Collins, Colo., 20-22 May 1980

(NASA-CP-2153) Avail: NTIS HC A12/MF A01 CSCL 08L  
CONFERENCES, HYDROLOGY, MICROWAVE  
RADIOMETERS, REMOTE SENSING, SNOW COVER

**N81-20489\*#** National Aeronautics and Space Administration. Washington, D.C.

### **DIGITAL PROCESSING OF REMOTELY SENSED IMAGES**

J. G. MOIK 1980 338 p refs Original document contains color illustrations

(NASA-SP-431; LC-79-16727) Avail: NTIS MF A01; SOD HC \$6.50 CSCL 05B

The foundations of image processing were reviewed. Imaging techniques are discussed and include: image resolution, image enhancement, image registration, image overlaying and mosaicking, image analysis and classification, and image data compression.

T.M.

**N81-20492\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LABORATORY TANK STUDIES OF A SINGLE SPECIES OF PHYTOPLANKTON USING A REMOTE SENSING FLUORENSENCE**

C. A. BROWN, JR., O. JARRETT, JR., and F. H. FARMER Apr. 1981 78 p refs

(NASA-TP-1821; L-14140) Avail: NTIS HC A05/MF A01 CSCL 06C

CHLOROPHYLLS, DYE LASERS, EXCITATION, FLUORESCENCE, PHYTOPLANKTON, PLANKTON

**N81-21437\*#** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

### **AERIAL COLOR INFRARED PHOTOGRAPHY: APPLICATIONS IN CITRICULTURE**

C. H. BLAZQUEZ and F. W. HORN, JR. Nov. 1980 89 p refs Prepared in cooperation with Florida Univ., Lake Alfred Original contains color illustrations

(NASA-RP-1067; TR-43-1) Avail: NTIS HC A05/MF A01 CSCL 02C

The photographic specifications and operational parameters in this handbook were determined in a large aerial color infrared (ACIR) photographic experiment and in a follow-up demonstration with the cooperation of Florida citrus growers and aerial photographers. The ACIR photography in the spring gave the best separation between healthy and diseased trees. The best scale for photointerpretation with the use of inexpensive analysis equipment was 1 in. = 333 ft. Photographs taken with a 12 in. focal length lens were far superior to those taken with a 6 in. focal length lens. A cell unit grid system, with window overlays for rapid photointerpretation and a black and white enlargement for ground verification, was developed for tree registration. Use of the enlargement in ground surveys reduced the survey time from 25 hours to 2.5 hours. The cell unit grid system is compatible with computer processing for rapid recording of photo interpreted data, storage, retrieval, and analysis. A mapping system with 99 percent accuracy was developed for fast surveillance of tree vigor and stress. A.R.H.

**N81-21440\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **WESTERN REGIONAL REMOTE SENSING CONFERENCE PROCEEDINGS, 1979**

1980 192 p Conf. held at Naval Postgraduate School, Monterey, Calif., 17 - 19 Oct. 1979

(NASA-CP-2148; REPT-A-8320) Avail: NTIS HC A09/MF A01 CSCL 05A

AGRICULTURE, CONFERENCES, RESOURCES  
MANAGEMENT, TECHNOLOGY TRANSFER

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**N82-12492\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **SKYLAB EXPLORES THE EARTH**

Washington 1977 512 p refs Original contains color illustrations

(NASA-SP-380; LC-77-829) Avail: NTIS MF A01; SOD HC \$16.50 CSCL 08B

Data from visual observations are integrated with results of analyses of approximately 600 of the nearly 2000 photographs taken of Earth during the 84-day Skylab 4 mission to provide additional information on (1) Earth features and processes; (2) operational procedures and constraints in observing and photographing the planet; and (3) the use of man in real-time analysis of oceanic and atmospheric phenomena. For individual titles, see N82-12493 through N82-12509.

**N82-13468\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **LABORATORY MEASUREMENTS OF PHYSICAL, CHEMICAL, AND OPTICAL CHARACTERISTICS OF LAKE CHICOT SEDIMENT WATERS**

W. G. WITTE, C. H. WHITLOCK, J. W. USRY, W. D. MORRIS, and E. A. GURGANUS Dec. 1981 30 p refs

(NASA-TP-1941; L-14714) Avail: NTIS HC A03/MF A01 CSCL 08H

LAKES, NEAR INFRARED RADIATION, OPTICAL PROPERTIES, REMOTE SENSING, SOLIDS FLOW, SPECTRAL SIGNATURES, TURBIDITY

**N82-19647\*#** Systematics General Corp., Sterling, Va.

### **GUIDELINES FOR SPACEBORNE MICROWAVE REMOTE SENSORS**

V. LITMAN (Applied Media, Inc., Greenbelt, Md.) and J. NICHOLAS Mar. 1982 87 p refs

(NASW-3398)

(NASA-RP-1086) Avail: NTIS HC A05/MF A01 CSCL 14B

A handbook was developed to provide information and support to the spaceborne remote sensing and frequency management communities: to guide sensor developers in the choice of frequencies; to advise regulators on sensor technology needs and sharing potential; to present sharing analysis models and, through example, methods for determining sensor sharing feasibility; to introduce developers to the regulatory process; to create awareness of proper assignment procedures; to present sensor allocations; and to provide guidelines on the use and limitations of allocated bands. Controlling physical factors and user requirements and the regulatory environment are discussed. Sensor frequency allocation achievable performance and usefulness are reviewed. Procedures for national and international registration, the use of non-allocated bands and steps for obtaining new frequency allocations, and procedures for reporting interference are also discussed. M.D.K.

**N82-20617\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **APPLICATIONS SYSTEMS VERIFICATION AND TRANSFER PROJECT. VOLUME 1: OPERATIONAL APPLICATIONS OF SATELLITE SNOW COVER OBSERVATIONS: EXECUTIVE SUMMARY**

A. RANGO Dec. 1981 81 p refs 8 Vol.

(NASA-TP-1822; NAS 1.60:1822; REPT-81F0060-VOL-1) Avail: NTIS HC A05/MF A01 CSCL 05B

ENVIRONMENTAL MONITORING, PHOTOMAPPING, RESOURCES MANAGEMENT, SNOW COVER, WATER RUNOFF

**N82-20618\*#** Geological Survey, Phoenix, Ariz.

### **APPLICATIONS SYSTEMS VERIFICATION AND TRANSFER PROJECT. VOLUME 2: OPERATIONAL APPLICATIONS OF SATELLITE SNOW-COVER OBSERVATIONS AND DATA-COLLECTION SYSTEMS IN THE ARIZONA TEST SITE**

H. H. SCHUMANN Dec. 1981 62 p refs 8 Vol.

(NASA-TP-1823; NAS 1.60:1823; REPT-81F0061-VOL-2) Avail: NTIS HC A04/MF A01 CSCL 08L

ARIZONA, ENVIRONMENTAL MONITORING, PHOTOMAPPING, RESOURCES MANAGEMENT, SNOW COVER, WATER RUNOFF, WATERSHEDS

**N82-20619\*#** California State Dept. of Water Resources, Sacramento.

### **APPLICATIONS SYSTEMS VERIFICATION AND TRANSFER PROJECT. VOLUME 3: OPERATIONAL APPLICATIONS OF SATELLITE SNOW COVER OBSERVATIONS IN CALIFORNIA**

A. J. BROWN and J. F. HANNAFORD (Sierra Hydrotech, Placerville, Calif.) Dec. 1981 70 p refs 8 Vol.

(NAS5-20831)

(NASA-TP-1824; NAS 1.60:1824; REPT-81F0062-VOL-3) Avail: NTIS HC A04/MF A01 CSCL 08L

AERIAL RECONNAISSANCE, FORECASTING, SNOW COVER, WATER RUNOFF

**N82-20620\*#** Soil Conservation Service, Denver, Colo.

### **APPLICATIONS SYSTEMS VERIFICATION AND TRANSFER PROJECT. VOLUME 4: OPERATIONAL APPLICATIONS OF SATELLITE SNOW COVER OBSERVATIONS. COLORADO FIELD TEST CENTER**

B. A. SHAFER, C. F. LEAF, J. A. DANIELSON (Colorado State Engineers Office), and G. F. MORAVEC (Colorado State Engineers Office) Dec. 1981 101 p refs 8 Vol.

(NASA-TP-1825; NAS 1.60:1825; REPT-81F0063-VOL-4) Avail: NTIS HC A06/MF A01 CSCL 08L

AERIAL RECONNAISSANCE, FORECASTING, SNOW COVER, WATER RUNOFF, WATERSHEDS

**N82-20621\*#** Bonneville Power Administration, Portland, Oreg.

### **APPLICATIONS SYSTEMS VERIFICATION AND TRANSFER PROJECT. VOLUME 5: OPERATIONAL APPLICATIONS OF SATELLITE SNOW-COVER OBSERVATIONS, NORTHWEST UNITED STATES**

J. P. DILLARD Dec. 1981 84 p refs 8 Vol.

(NASA ORDER S-53877)

(NASA-TP-1826; NAS 1.60:1826; REPT-81F0064-VOL-5) Avail: NTIS HC A05/MF A01 CSCL 08L

AERIAL RECONNAISSANCE, FORECASTING, SNOW COVER, WATER RUNOFF

**N82-20622\*#** National Environmental Satellite Service, Washington, D. C.

### **APPLICATIONS SYSTEMS VERIFICATION AND TRANSFER PROJECT. VOLUME 6: OPERATIONAL APPLICATIONS OF SATELLITE SNOW-COVER OBSERVATIONS NOAA/NESS SUPPORT STUDY Final Report, 1 Jan. 1975 - 31 Dec. 1978**

S. R. SCHNEIDER Dec. 1981 68 p refs 8 Vol.

(NASA ORDER S-53772)

(NASA-TP-1827; NAS 1.60:1827; REPT-81F0065-VOL-6) Avail: NTIS HC A04/MF A01 CSCL 05B

ENVIRONMENTAL MONITORING, HYDROLOGY MODELS, PHOTOMAPPING, RESOURCES MANAGEMENT, SNOW COVER, WATER RUNOFF



## 43 EARTH RESOURCES AND REMOTE SENSING

**N82-20623\*#** Ecosystems International, Inc., Gambrills, Md.  
**APPLICATIONS SYSTEMS VERIFICATION AND TRANSFER PROJECT. VOLUME 7: COST/BENEFIT ANALYSIS FOR THE ASVT ON OPERATIONAL APPLICATIONS OF SATELLITE SNOW-COVER OBSERVATIONS**

P. CASTRUCCIO, H. LOATS, D. LLOYD, and P. NEWMAN Dec. 1981 245 p refs 8 Vol.

(NAS5-29729)

(NASA-TP-1828; NAS 1.60:1818; REPT-81F0066-VOL-7) Avail:

NTIS HC A11/MF A01 CSCL 08L

AERIAL RECONNAISSANCE, COST ANALYSIS, FORECASTING, SNOW COVER, WATER RUNOFF

**N82-20624\*#** Environmental Research and Technology, Inc., Concord, Mass.

**APPLICATIONS SYSTEMS VERIFICATION AND TRANSFER PROJECT. VOLUME 8: SATELLITE SNOW MAPPING AND RUNOFF PREDICTION HANDBOOK**

C. J. BOWLEY, J. C. BARNES, and A. RANGO (NASA. Goddard Space Flight Center) Dec. 1981 98 p refs 8 Vol.

(NAS5-24410)

(NASA-TP-1829; NAS 1.60:1829; REPT-81F0067-VOL-8) Avail:

NTIS HC A05/MF A01 CSCL 08L

FORECASTING, HANDBOOKS, PHOTOINTERPRETATION, SNOW COVER, WATER RUNOFF

**N82-22546\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**WESTERN REGIONAL REMOTE SENSING CONFERENCE PROCEEDINGS, 1981**

Sep. 1981 263 p refs Conf. held at Monterey, Calif., 30 Mar.

- 2 Apr. 1981 Original contains imagery. Original photography

may be purchased from the EROS Data Center, Sioux Falls, S. Dak., 57198 ERTS

(E82-10104; NASA-CP-2195; NAS 1.55:2195; A-8663) Avail:

NTIS HC A12/MF A01 CSCL 05A

CONFERENCES, FEDERAL BUDGETS, IMAGING TECHNIQUES, INFORMATION SYSTEMS, TECHNOLOGY TRANSFER, UNITED STATES

**N83-10458\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE LANDSAT TUTORIAL WORKBOOK: BASICS OF SATELLITE REMOTE SENSING**

N. M. SHORT, Principal Investigator 1982 554 p refs Original contains color imagery. Original photography may be purchased

from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS

(E83-10001; NASA-RP-1078; NAS 1.61:1078; LC-81-600117)

Avail: NTIS MF A01; SOD HC \$55.00 CSCL 05B

Most of the subject matter of a full training course in applying remote sensing is presented in a self-teaching mode in this how-to manual which combines a review of basics, a survey of systems, and a treatment of the principles and mechanics of image analysis by computers, with a laboratory approach for learning to utilize the data through practical experiences. All relevant image products are included. For individual titles, see N83-10459 through N83-10471.

**N83-17942\*#** Purdue Univ., West Lafayette, Ind. Lab. for Applications of Remote Sensing.

**CORSE-81: THE 1981 CONFERENCE ON REMOTE SENSING EDUCATION**

S. M. DAVIS, comp. 1981 375 p refs Conf. held in Lafayette, Ind., 18-22 May 1981 Sponsored by NASA and NOAA Original contains imagery. Original photography may be

purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(E83-10179; NASA-CP-2197; NAS 1.55:2197) Avail: NTIS HC

A16/MF A01 CSCL 05I

EDUCATION, REMOTE SENSING, UNIVERSITIES

**N83-19141\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**SECOND EASTERN REGIONAL REMOTE SENSING APPLICATIONS CONFERENCE**

M. L. IMHOFF, ed., R. G. WITT, ed., and D. KUGELMANN, ed.

1981 398 p refs Conf. held in Danvers, Mass., 9-11 Mar.

1981 Original contains imagery. Original photography may be

purchased from the EROS Data Center, Sioux Falls, S.D. 57198.

ERTS

(E83-10189; NASA-CP-2198; NAS 1.55:2198) Avail: NTIS HC

A17/MF A01 CSCL 05B

DATA PROCESSING, GEOGRAPHIC INFORMATION SYSTEMS, REMOTE SENSING, RESOURCES MANAGEMENT, THEMATIC MAPPING, UNITED STATES

**N83-21419\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**EASTERN REGIONAL REMOTE SENSING APPLICATIONS CONFERENCE**

N. M. SHORT, ed. Jan. 1981 240 p refs Conf. held in

Easton, Md., 2-5 Oct. 1979 Original contains imagery. Original

photography may be purchased from the EROS Data Center,

Sioux Falls, S.D. 57198 ERTS

(E83-10201; NASA-CP-2173; NAS 1.55:2173) Avail: NTIS HC

A11/MF A01 CSCL 08B

CONFERENCES, REMOTE SENSING, RESOURCES MANAGEMENT, TECHNOLOGY TRANSFER, UNITED STATES

**N83-23660\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE SNOWMELT-RUNOFF MODEL (SRM) USER'S MANUAL**

J. MARTINEC (Swiss Federal Inst. for Snow and Avalanche

Research), A. RANGO, and E. MAJOR (Research and Data

Systems, Inc.) Apr. 1983 120 p refs

(NASA-RP-1100; REPT-83B0251; NAS 1.61:1100) Avail: NTIS

HC A06/MF A01 CSCL 08H

A manual to provide a means by which a user may apply the snowmelt runoff model (SRM) unaided is presented. Model structure, conditions of application, and data requirements, including remote sensing, are described. Guidance is given for determining various model variables and parameters. Possible sources of error are discussed and conversion of snowmelt runoff model (SRM) from the simulation mode to the operational forecasting mode is explained. A computer program is presented for running SRM is easily adaptable to most systems used by water resources agencies.

E.A.K.

**N83-26155\*#** Marshall Univ., Huntington, W. Va.

**PROCEEDINGS OF THE NATIONAL CONFERENCE ON ENERGY RESOURCE MANAGEMENT. VOLUME 1: TECHNIQUES, PROCEDURES AND DATA BASES**

J. O. BRUMFIELD, ed. and Y. M. SCHIFFMAN, ed. 1982 306

p refs Conf. held in Baltimore, 9-12 Sep. 1982; sponsored by

NASA, American Planning Association, Nuclear Regulatory

Commission and US Region of the Remote Sensing Society

Sponsored by NASA Original contains imagery. Original

photography may be purchased from the EROS Data Center, Sioux

Falls, S.D. 57198 ERTS 2 Vol.

(E83-10335; NASA-CP-2261-VOL-1; NAS 1.55:2261-VOL-1)

Avail: NTIS HC A14/MF A01 CSCL 05B

CONFERENCES, DATA BASES, DATA INTEGRATION, ENERGY SOURCES, GEOGRAPHIC INFORMATION SYSTEMS, IMAGE ANALYSIS, RESOURCES MANAGEMENT

## 43 EARTH RESOURCES AND REMOTE SENSING

**N83-26176\*#** Marshall Univ., Huntington, W. Va.  
**PROCEEDINGS OF THE NATIONAL CONFERENCE ON ENERGY RESOURCE MANAGEMENT. VOLUME 2: APPLICATIONS**  
J. O. BRUMFIELD, ed. and Y. M. SCHIFFMAN, ed. 1982 415 p refs Conf. held in Baltimore, 9-12 Sep. 1982; sponsored by NASA, American Planning Association, Nuclear Regulatory Commission and US Region of the Remote Sensing Society. Sponsored by NASA. Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 2 Vol.  
(E83-10336; NASA-CP-2261-VOL-2; NAS 1.55:2261-VOL-2)  
Avail: NTIS HC A18/MF A01  
BIOMASS, CONFERENCES, ENERGY SOURCES, ENVIRONMENTAL MONITORING, GEOGRAPHIC INFORMATION SYSTEMS, LAND USE, MINES (EXCAVATIONS), RESOURCES MANAGEMENT, SITE SELECTION

**N83-26201\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**OCEAN COLOR ALGORITHM FOR REMOTE SENSING OF CHLOROPHYLL**  
G. W. GREW and L. S. MAYO May 1983 29 p refs  
(NASA-TP-2164; L-15573; NAS 1.60:2164) Avail: NTIS HC A03/MF A01 CSCL 08A  
OCEAN COLOR SCANNER, OCEANOGRAPHIC PARAMETERS, REMOTE SENSING

**N83-27293\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**WILDLAND INVENTORY AND RESOURCE MODELING FOR DOUGLAS AND CARSON CITY COUNTIES, NEVADA, USING LANDSAT AND DIGITAL TERRAIN DATA**  
J. A. BRASS, W. C. LIKENS, and R. R. THORNHILL (Nevada Div. of Forestry, Carson City) Mar. 1983 50 p refs ERTS  
(E83-10302; NASA-TP-2137; A-8997; NAS 1.60:2137) Avail: NTIS HC A03/MF A01 CSCL 08B  
CLASSIFICATIONS, DATA REDUCTION, FORESTS, HABITATS, LAND USE, NEVADA, TIMBER INVENTORY, WILDERNESS

**N83-28506\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**THE MULTISPECTRAL IMAGING SCIENCE WORKING GROUP. VOLUME 3: APPENDICES Final Report**  
S. C. COX, ed. 1 Sep. 1982 299 p refs Proc. of working groups held in Pasadena, Calif. and in Silver Spring, Md., 1982; sponsored by NASA, Washington. Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS  
(E83-10351; NASA-CP-2260-VOL-3; NAS 1.55:2260-VOL-3)  
Avail: NTIS HC A13/MF A01 CSCL 20F  
CONFERENCES, IMAGE RESOLUTION, IMAGING TECHNIQUES, MULTISPECTRAL PHOTOGRAPHY, SPECTRAL BANDS

**N83-29750\*#** National Aeronautics and Space Administration. Earth Resources Lab., Bay St. Louis, Miss.  
**LITERATURE REVIEW OF ORGANIC MATTER TRANSPORT FROM MARSHES**  
D. D. DOW May 1982 79 p refs ERTS  
(E83-10352; NASA-TP-2022; NAS 1.60:2022) Avail: NTIS HC A05/MF A01 CSCL 13B  
COASTAL ECOLOGY, ESTUARIES, MARSHLANDS, MATHEMATICAL MODELS, ORGANIC MATERIALS, SEDIMENT TRANSPORT, WETLANDS

**N84-14563\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**THE HEAT CAPACITY MAPPING MISSION (HCMM) ANTHOLOGY**  
N. M. SHORT and L. M. STUART, JR., Principal Investigators 1982 268 p refs Original contains color imagery. Original imagery may be purchased from NASA. Goddard Space Flight Center, (code 601), Greenbelt, Md. 20770. Domestic users send orders to "Attn: National Space Science Data Center"; non-domestic users send orders to "Attn: World Data Center A for Rockets and Satellites". HCMM  
(E84-10051; NASA-SP-465; NAS 1.21:465) Avail: SOD HC \$24.00 CSCL 08B

The analysis and interpretation of thermal imagery is explained in this tutorial which reviews and evaluates a program that surveyed reflected solar radiation and thermal emission from the Earth's surface with a spatial resolution of 600 meters. For individual titles, see N84-14564 through N84-14570.

**N84-27262\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**FRONTIERS OF REMOTE SENSING OF THE OCEANS AND TROPOSPHERE FROM AIR AND SPACE PLATFORMS**  
Washington May 1984 615 p refs Symp. held in Shores, Israel, 14-23 May 1984; sponsored in cooperation with the Israel Academy of Sciences and Humanities  
(NASA-CP-2303; NAS 1.55:2303) Avail: NTIS HC A99/MF A01 CSCL 08C

AIR WATER INTERACTIONS, OCEAN CURRENTS, OCEANS, REMOTE SENSING, SATELLITE OBSERVATION, SEA ICE, TOPOGRAPHY

**N85-11404\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**THE MULTISPECTRAL IMAGING SCIENCE WORKING GROUP. VOLUME 1: EXECUTIVE SUMMARY Final Report**  
S. C. COX, ed. Washington 1 Sep. 1982 39 p Working groups held in Pasadena, Calif., San Antonio, and Silver Spring, Md., 1 Sep. 1982. Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 3 Vol.  
(E85-10001; NASA-CP-2260-VOL-1; NAS 1.55:2260-VOL-1)  
Avail: NTIS HC A03/MF A01 CSCL 05B  
GEOGRAPHY, GEOLOGY, HYDROLOGY, IMAGE ANALYSIS, IMAGE RESOLUTION, MULTISPECTRAL PHOTOGRAPHY, SATELLITE IMAGERY, TECHNOLOGY ASSESSMENT, THEMATIC MAPPING, VEGETATION

**N85-11405\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**THE MULTISPECTRAL IMAGING SCIENCE WORKING GROUP. VOLUME 2: WORKING GROUP REPORTS Final Report**  
S. C. COX, ed. Washington 1 Sep. 1982 336 p refs Meetings held in Pasadena, Calif., San Antonio, and Silver Spring, Md., 1982. Original contains imagery. Original photography may be purchased from EROS Data Center, Sioux Falls, S.D. 57198 ERTS 3 Vol.  
(E85-10002; NASA-CP-2260-VOL-2; NAS 1.55:2260-VOL-2)  
Avail: NTIS HC A15/MF A01 CSCL 05B  
CONFERENCES, GEOGRAPHY, GEOLOGY, HYDROLOGY, IMAGE ANALYSIS, IMAGE RESOLUTION, MULTISPECTRAL PHOTOGRAPHY, SATELLITE IMAGERY, TECHNOLOGY ASSESSMENT, THEMATIC MAPPING, VEGETATION

## 43 EARTH RESOURCES AND REMOTE SENSING

**N85-20496\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **LANDSAT-4 SCIENCE CHARACTERIZATION EARLY RESULTS. VOLUME 1: MULTISPECTRAL SCANNER (MSS)**

J. L. BARKER, ed. Washington Jan. 1985 206 p refs Symp. held in Greenbelt, Md., 22-24 Feb. 1983 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 4 Vol.

(E85-10067; NASA-CP-2355-VOL-1; REPT-85B0115-VOL-1; NAS 1.55:2355-VOL-1) Avail: NTIS HC A10/MF A01 CSCL 05B

LANDSAT 4, MULTISPECTRAL BAND SCANNERS, SATELLITE IMAGERY

**N85-20508\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **LANDSAT-4 SCIENCE CHARACTERIZATION EARLY RESULTS. VOLUME 2, PART 1: THEMATIC MAPPER (TM)**

J. L. BARKER, ed. Washington Jan. 1985 482 p refs Symp. held in Greenbelt, Md., 22-24 Feb. 1983 Original contains imagery. Original photography may be purchased at the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 4 Vol.

(E85-10068; NASA-CP-2355-VOL-2-PT-1; REPT-85B0115-VOL-2-PT-1; NAS 1.55:2355-VOL-2-PT-1) Avail: NTIS HC A21/MF A01 CSCL 08B

CONFERENCES, LANDSAT 4, REMOTE SENSORS, SATELLITE IMAGERY, SPECTRAL RESOLUTION, THEMATIC MAPPING

**N85-21724\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **LANDSAT-4 SCIENCE CHARACTERIZATION EARLY RESULTS. VOLUME 3, PART 2: THEMATIC MAPPER (TM)**

J. L. BARKER, ed. Washington Jan. 1985 591 p refs Symp. held in Greenbelt, Md., 22-24 Feb. 1983 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 4 Vol.

(E85-10069; NASA-CP-2355-VOL-3-PT-2; REPT-85B0115-VOL-3-PT-2; NAS 1.55:2355-VOL-3-PT-2) Avail: NTIS HC A25/MF A01 CSCL 08B

GEOMETRIC ACCURACY, IMAGE RESOLUTION, LANDSAT 4, RADIOMETRIC RESOLUTION, SATELLITE IMAGERY, SPECTRAL RESOLUTION, THEMATIC MAPPING

**N85-23186\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **LANDSAT-4 SCIENCE CHARACTERIZATION EARLY RESULTS. VOLUME 4: APPLICATIONS**

J. L. BARKER, ed. Washington Jan. 1985 442 p refs Symp. held in Greenbelt, Md., 22-24 Feb. 1983 Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 4 Vol.

(E85-10070; NASA-CP-2355-VOL-4; REPT-85B0115-VOL-4; NAS 1.55:2355-VOL-4) Avail: NTIS HC A19/MF A01 CSCL 08B

CONFERENCES, DIGITAL DATA, IMAGE PROCESSING, LANDSAT 4, SATELLITE IMAGERY, SPECTRAL SENSITIVITY, THEMATIC MAPPING

**N85-23223\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **REMOTE SENSING OF SNOW AND EVAPOTRANSPIRATION**

T. SCHMUGGE, ed. Washington Feb. 1985 176 p refs Proc. of 2nd workshop held in Honolulu, Hawaii, 15-19 Nov. 1983 Original contains color illustrations

(NASA-CP-2363; REPT-84B0036; NAS 1.55:2363) Avail: NTIS HC A09/MF A01 CSCL 08L

CONFERENCES, EVAPOTRANSPIRATION, HYDROLOGY MODELS, MICROWAVE EMISSION, REMOTE SENSING, SNOW, WATER RUNOFF

**N85-23237\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **CHARACTERISTIC VECTOR ANALYSIS OF INFLECTION RATIO SPECTRA: NEW TECHNIQUE FOR ANALYSIS OF OCEAN COLOR DATA**

G. W. GREW Apr. 1985 26 p refs

(NASA-TP-2428; NAS 1.60:2428; L-15885) Avail: NTIS HC A03/MF A01 CSCL 05B

ALGAE, CHLOROPHYLLS, OCEAN COLOR SCANNER, OCEAN DYNAMICS, REMOTE SENSING, VECTOR ANALYSIS

**N85-30450\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SPECTRAL REFLECTANCES OF NATURAL TARGETS FOR USE IN REMOTE SENSING STUDIES**

D. E. BOWKER, R. E. DAVIS, D. L. MYRICK, K. STACY, and W. T. JONES Jun. 1985 185 p refs Prepared in cooperation with Computer Sciences Corp.

(NASA-RP-1139; L-15920; NAS 1.61:1139) Avail: NTIS HC A09/MF A01 CSCL 20F

A collection of spectral reflectances of 156 natural targets is presented in a uniform format. For each target both a graphical plot and a digital tabulation of reflectance is given. The data were taken from the literature and include laboratory, field, and aircraft measurements. A discussion of the different measurements of reflectance is given, along with the changes in apparent reflectance when targets are viewed through the atmosphere. The salient features of the reflectance curves of common target types are presented and discussed.

Author

**N86-31940\*** National Aeronautics and Space Administration, Washington, D.C.

### **EARTH RESOURCES: A CONTINUING BIBLIOGRAPHY WITH INDEXES, ISSUE 50**

1986 146 p

(NASA-SP-7041(50); NAS 1.21:7041(50)) Avail: NTIS HC A07 CSCL 05B

This bibliography lists 523 reports, articles and other documents introduced into the NASA scientific and technical information system between April 1 and June 30, 1986. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economic analysis.

Author

**N86-31945\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **LANDSAT-4 AND LANDSAT-5 MULTISPECTRAL SCANNER COHERENT NOISE CHARACTERIZATION AND REMOVAL**

J. C. TILTON and W. L. ALFORD, principal investigators (Defense Mapping Agency, Washington, D.C.) May 1986 46 p Original contains color illustrations

(NASA-TP-2595; REPT-86B0040; NAS 1.60:2595) Avail: NTIS HC A03/MF A01 CSCL 14B

CONTINUOUS NOISE, ELECTRONIC FILTERS, IMAGE PROCESSING, LANDSAT 4, LANDSAT 5, LOW PASS FILTERS, MULTISPECTRAL BAND SCANNERS

## ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.

**N77-16437\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**SECONDARY AEROSPACE BATTERIES AND BATTERY MATERIALS: A BIBLIOGRAPHY, 1969 - 1974**  
P. MCDERMOTT, G. HALPERT, S. EKPANYASKUN, and P. NCHE Jul. 1976 161 p  
(NASA-SP-7044) Avail: NTIS HC A08 CSCL 09A

This annotated bibliography on the subject of secondary aerospace battery materials and related physical and electrochemical processes was compiled from references to journal articles published between 1969 and 1974. A total of 332 citations are arranged in chronological order under journal titles. Indices by system and component, techniques and processes, and author are included. Author

**N77-30617\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**AN ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF A 1.8 BY 3.7 METER FRESNEL LENS SOLAR CONCENTRATOR**  
L. J. HASTINGS, S. L. ALLUMS, and W. S. JENSEN Aug. 1977 77 p refs  
(NASA-TP-1005; M-224) Avail: NTIS HC A05/MF A01 CSCL 10A

ENERGY TRANSFER, FRESNEL LENSES, SOLAR COLLECTORS

**N78-13527\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**SOLAR CELL HIGH EFFICIENCY AND RADIATION DAMAGE**  
1977 221 p refs Conf. held at Cleveland, 18-19 May 1977  
(NASA-CP-2020) Avail: NTIS HC A10/MF A01 CSCL 10A  
CONFERENCES, CRYSTAL DEFECTS, ENERGY CONVERSION EFFICIENCY, ENERGY POLICY, ENERGY SOURCES, RADIATION DAMAGE, SEMICONDUCTOR JUNCTIONS, SOLAR CELLS

**N78-19600\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**GUNTERSVILLE WORKSHOP ON SOLAR-TERRESTRIAL STUDIES**  
1977 71 p Presented at University of Alabama in Huntsville/NASA Workshop, 13-17 Oct. 1977, Lake Guntersville State Park Convention Center, Guntersville, Alabama  
(NASA-CP-2037) Avail: NTIS HC A04/MF A01 CSCL 10A  
CONFERENCES, EARTH ATMOSPHERE, GEOPHYSICS, NASA PROGRAMS, SOLAR PHYSICS, SPACECRAFT MODULES

**N78-19616\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**WIND TURBINE STRUCTURAL DYNAMICS**  
D. R. MILLER, ed. 1978 280 p refs Workshop held at Cleveland, 15-17 Nov. 1977; sponsored by DOE  
(NASA-CP-2034; DOE-CONF-771148; E-9518) Avail: NTIS HC A13/MF A01 CSCL 10A  
DYNAMIC LOADS, DYNAMIC STRUCTURAL ANALYSIS, MECHANICAL DRIVES, TURBINES, WINDPOWERED GENERATORS

**N78-23571\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**NUCLEAR WASTE DISPOSAL IN SPACE**  
R. E. BURNS, W. E. CAUSEY, W. E. GALLOWAY, and R. W. NELSON May 1978 118 p refs  
(NASA-TP-1225; M-250) Avail: NTIS HC A06/MF A01 CSCL 18G

AEROSPACE ENVIRONMENTS, RADIOACTIVE WASTES, WASTE DISPOSAL

**N78-28615\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EMERGING ENERGY ALTERNATIVES FOR THE SOUTHEASTERN STATES**  
E. K. STEFANAKOS, ed. 1978 149 p refs Proc. of Symp. held at North Carolina A and T State Univ., Greensboro, 31 Mar. 1978; sponsored by DOE and North Carolina A and T State Univ.  
(NASA-CP-2042; L-12251) Avail: NTIS HC A07/MF A01 CSCL 10A

CONFERENCES, ENERGY POLICY, ENERGY SOURCES, UNITED STATES

**N78-28624\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**SOLUBILITY, STABILITY, AND ELECTROCHEMICAL STUDIES OF SULFUR-SULFIDE SOLUTIONS IN ORGANIC SOLVENTS**  
W. L. FIELDER and J. SINGER Aug. 1978 43 p refs  
(NASA-TP-1245; E-9552) Avail: NTIS HC A03/MF A01 CSCL 10A

ELECTRIC MOTOR VEHICLES, ELECTROCHEMICAL CELLS, ORGANIC SULFUR COMPOUNDS, SULFIDES

**N79-21565\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**THE 1977 GODDARD SPACE FLIGHT CENTER BATTERY WORKSHOP**  
1977 579 p Workshop held at Greenbelt, Md., 15-17 Nov. 1977  
(NASA-CP-2041) Avail: NTIS HC A25/MF A01 CSCL 10C  
CONFERENCES, ELECTRIC BATTERIES, SPACECRAFT POWER SUPPLIES, STORAGE BATTERIES, TECHNOLOGY ASSESSMENT

**N79-22626\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**EFFECT OF STEAM ADDITION ON CYCLE PERFORMANCE OF SIMPLE AND RECUPERATED GAS TURBINES**  
R. J. BOYLE Apr. 1979 52 p refs  
(NASA-TP-1440; E-9795) Avail: NTIS HC A04/MF A01 CSCL 10B  
FLUID INJECTION, GAS TURBINES, STEAM FLOW, THERMODYNAMIC CYCLES

**N79-28669\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**THE 11TH ANNUAL BATTERY WORKSHOP**  
1978 545 p Workshop held at Goddard Space Flight Center, Greenbelt, Md., 15-17 Nov. 1978  
(NASA-CP-2088) Avail: NTIS HC A23/MF A01 CSCL 10C  
CONFERENCES, ELECTROCHEMISTRY, SPACECRAFT POWER SUPPLIES, STORAGE BATTERIES

**N79-32640\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**SOLAR CELL HIGH EFFICIENCY AND RADIATION DAMAGE, 1979**  
Aug. 1979 290 p refs Conf. held at Cleveland, 13-14 Jun. 1979  
(NASA-CP-2097; D-133) Avail: NTIS HC A13/MF A01 CSCL 10A  
CONFERENCES, ENERGY CONVERSION EFFICIENCY, RADIATION TOLERANCE, SOLAR CELLS

## 44 ENERGY PRODUCTION AND CONVERSION

**N79-33572\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **ANNEALING OF RADIATION DAMAGE IN 0.1- AND 2-OHM-CENTIMETER SILICON SOLAR CELLS**

I. WEINBERG and C. K. SWARTZ Oct. 1979 13 p refs (NASA-TP-1559; E-9997) Avail: NTIS HC A02/MF A01 CSCL 10A

ANNEALING, RADIATION DAMAGE, SOLAR CELLS

**N80-11559\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AN EVALUATION OF THE NASA TECH HOUSE, INCLUDING LIVE-IN TEST RESULTS, VOLUME 1**

I. H. A. ABBOTT, K. A. HOPPING, and W. D. HYPES Nov. 1979 72 p refs

(NASA-TP-1564; L-13440) Avail: NTIS HC A04/MF A01 CSCL 10A

BUILDINGS, ENERGY CONSERVATION, NASA PROGRAMS, SOLAR HOUSES, TECHNOLOGY ASSESSMENT, WASTE WATER

**N80-16453\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **LARGE WIND TURBINE DESIGN CHARACTERISTICS AND R AND D REQUIREMENTS**

S. LIEBLEIN, ed. (Technical Report Services, Rocky River, Ohio) Dec. 1979 459 p refs Conf. held at Cleveland, 24-26 Apr. 1979; sponsored in part by DOE

(NASA-CP-2106; CONF-7904111) Avail: NTIS HC A20/MF A01 CSCL 10B

ELECTRIC GENERATORS, ENERGY CONVERSION, ENERGY TECHNOLOGY, WINDPOWER UTILIZATION, WINDPOWERED GENERATORS

**N80-20820\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **THE 1979 GODDARD SPACE FLIGHT CENTER BATTERY WORKSHOP**

G. HALPERT, ed. Apr. 1980 521 p refs Workshop held in Greenbelt, Md., 13-15 Nov. 1979

(NASA-CP-2117) Avail: NTIS HC A22/MF A01 CSCL 10C

AEROSPACE ENGINEERING, CONFERENCES, ELECTRIC BATTERIES, ELECTROCHEMISTRY, SPACECRAFT POWER SUPPLIES

**N80-22788\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **THERMAL ENERGY STORAGE: FOURTH ANNUAL REVIEW MEETING**

Mar. 1980 650 p refs Meeting held at Tysons Corner, Va., 3-4 Dec. 1979; sponsored by DOE

(NASA-CP-2125; E-428; CONF-791232) Avail: NTIS HC A99/MF A01 CSCL 10C

CONFERENCES, ENERGY POLICY, ENERGY TECHNOLOGY, HEAT STORAGE, THERMAL ENERGY

**N81-16533\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **SOLAR POWER SATELLITE MICROWAVE TRANSMISSION AND RECEPTION**

R. H. DIETZ Dec. 1980 271 p refs Workshop held in Houston, Tex., 15-18 Jan. 1980

(NASA-CP-2141; S-503) Avail: NTIS HC A16/MF A01 CSCL 10A

CONFERENCES, MICROWAVE TRANSMISSION, RECTENNAS, SATELLITE POWER TRANSMISSION (TO EARTH), SOLAR POWER SATELLITES, SYSTEMS ENGINEERING

**N81-17531\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SPACE PHOTOVOLTAIC RESEARCH AND TECHNOLOGY 1980. HIGH EFFICIENCY, RADIATION DAMAGE AND BLANKET TECHNOLOGY**

1980 395 p refs Conf. held in Cleveland, 15-17 Oct. 1980 (NASA-CP-2169; E-469) Avail: NTIS HC A17/MF A01 CSCL 10A

CONFERENCES, LASER ANNEALING, RADIATION DAMAGE, SEMICONDUCTORS (MATERIALS), SILICON, SOLAR CELLS

**N81-18493\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **SOLAR POWER SATELLITE SYSTEM SIZING TRADEOFFS**

G. D. ARNDT and L. G. MONFORD Feb. 1981 44 p refs (NASA-TP-1804; S-505) Avail: NTIS HC A03/MF A01 CSCL 10A

ANTENNA DESIGN, COST ANALYSIS, ENERGY CONVERSION EFFICIENCY, SOLAR POWER SATELLITES, SYSTEMS ENGINEERING, TRADEOFFS

**N81-21493\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **THE 1980 GODDARD SPACE FLIGHT CENTER BATTERY WORKSHOP**

G. HALPERT Mar. 1981 426 p Proceedings of workshop held at Greenbelt, Md., 18-20 November 1980

(NASA-CP-2177) Avail: NTIS HC A19/MF A01 CSCL 10C

CONFERENCES, ELECTROCHEMICAL CELLS, SAFETY FACTORS, SYSTEMS ENGINEERING

**N81-27622\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **SATELLITE POWER SYSTEM: CONCEPT DEVELOPMENT AND EVALUATION PROGRAM. VOLUME 3: POWER TRANSMISSION AND RECEPTION. TECHNICAL SUMMARY AND ASSESSMENT**

R. H. DIETZ, G. D. ARNDT, J. W. SEYL, L. LEOPOLD, and J. S. KELLEY Jul. 1981 280 p refs

(NASA-RP-1076; S-507) Avail: NTIS HC A13/MF A01 CSCL 10A

Efforts in the DOE/NASA concept development and evaluation program are discussed for the solar power satellite power transmission and reception system. A technical summary is provided together with a summary of system assessment activities. System options and system definition drivers are described. Major system assessment activities were in support of the reference system definition, solid state system studies, critical technology supporting investigations, and various system and subsystem tradeoffs. These activities are described together with reference system updates and alternative concepts for each of the subsystem areas. Conclusions reached as a result of the numerous analytical and experimental evaluations are presented. Remaining issues for a possible follow-on program are identified. A.R.H.

**N82-16477\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **NEW FEATURES AND APPLICATIONS OF PRESTO, A COMPUTER CODE FOR THE PERFORMANCE OF REGENERATIVE, SUPERHEATED STEAM TURBINE CYCLES**

Y. K. CHOO and P. J. STAIGER Jan. 1982 39 p refs (NASA-TP-1954; E-721) Avail: NTIS HC A03/MF A01 CSCL 10B

COMPUTERIZED SIMULATION, REGENERATION (ENGINEERING), STEAM TURBINES, THERMODYNAMIC CYCLES, TURBOGENERATORS

## 44 ENERGY PRODUCTION AND CONVERSION

**N82-23684\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **WIND TURBINE DYNAMICS**

R. W. THRESHER, ed. (Oregon State Univ., Corvallis) May 1981 422 p refs Workshop held in Cleveland 24-26 Feb. 1981 Sponsored in part by DOE

(NASA-CP-2185; NAS 1.55:2185; CONF-810226;

SERI/CP-635-1238) Avail: NTIS HC A18/MF A01 CSCL 10B

DYNAMIC STRUCTURAL ANALYSIS, ROTOR AERODYNAMICS, WIND TURBINES, WINDMILLS (WINDPOWERED MACHINES), WINDPOWERED GENERATORS

**N82-28783\*#** National Aeronautics and Space Administration, Washington, D.C.

### **CAPTURING ENERGY FROM THE WIND**

J. L. SCHEFTER 1982 88 p refs Original contains color illustrations

(NASA-SP-455; NAS 1.21:455; LC-81-600180) Avail: NTIS MF

A01; SOD HC \$6.00 as 033-000-008-50-3 CSCL 10A

The history of windpower is reviewed. Wind turbine technology is discussed. Examples of small and large turbines are provided. Electric power generation is considered. Numerous illustrations are included. N.W.

**N82-32859\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **ENERGY SAVING CONCEPTS RELATING TO INDUCTION GENERATORS**

F. J. NOLA Aug. 1980 12 p refs

(NASA-TP-1719; NAS 1.60:1719) Avail: NTIS HC A02/MF A01

CSCL 10B

ELECTRIC GENERATORS, ENERGY POLICY, INDUCTION MOTORS, WINDPOWER UTILIZATION, WINDPOWERED GENERATORS

**N83-14684\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **LITHIUM/SULFUR DIOXIDE CELL AND BATTERY SAFETY**

G. HALPERT and A. ANDERSON Nov. 1982 19 p refs

(NASA-RP-1099; NAS 1.61:1099) Avail: NTIS HC A02/MF A01

CSCL 10C

The new high-energy lithium/sulfur dioxide primary electrochemical cell, having a number of advantages, has received considerable attention as a power source in the past few years. With greater experience and improved design by the manufacturers, this system can be used in a safe manner provided the guidelines for use and safety precautions described herein are followed. In addition to a description of cell design and appropriate definitions, there is a safety precautions checklist provided to guide the user. Specific safety procedures for marking, handling, transportation, and disposal are also given, as is a suggested series of tests, to assure manufacturer conformance to requirements. Author

**N83-15806\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SPACE PHOTOVOLTAIC RESEARCH AND TECHNOLOGY 1982: HIGH EFFICIENCY, RADIATION DAMAGE, AND BLANKET TECHNOLOGY**

Washington 1982 263 p refs Conf. held in Cleveland, 20-22 Apr. 1982

(NASA-CP-2256; E-1303; NAS 1.55:2256) Avail: NTIS HC

A12/MF A01 CSCL 10A

CONFERENCES, PHOTOVOLTAIC CELLS, SPACE PLATFORMS, SPACECRAFT POWER SUPPLIES

**N83-18024\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SEMICONDUCTOR PHOTOELECTROCHEMISTRY**

A. M. BUONCRISTIANI (Christopher Newport Coll.) and C. E. BYVIK Jan. 1983 94 p refs

(NSG-1514)

(NASA-TP-2088; L-15495; NAS 1.60:2088) Avail: NTIS HC

A05/MF A01 CSCL 10A

CHARGE CARRIERS, CHARGE DISTRIBUTION, CHARGE TRANSFER, ELECTRODES, ENERGY CONVERSION, PHOTOELECTROCHEMISTRY, SEMICONDUCTORS (MATERIALS)

**N83-19231\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **LARGE HORIZONTAL-AXIS WIND TURBINES**

R. W. THRESHER, ed. (Oregon State Univ., Corvallis) 1982 823 p refs Workshop held in Cleveland, 28-30 Jul. 1981

Sponsored in part by DOE

(NASA-CP-2230; NAS 1.55:2230; CONF-810752;

SERI/CP-635-1273) Avail: NTIS HC A99/MF A01 CSCL 10A

CONFERENCES, DESIGN ANALYSIS, ENERGY POLICY, ROTOR BLADES (TURBOMACHINERY), SITE SELECTION, WIND (METEOROLOGY), WIND TURBINES, WINDPOWERED GENERATORS

**N83-36549\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **ANALYSIS OF POTENTIAL BENEFITS OF INTEGRATED-GASIFIER COMBINED CYCLES FOR A UTILITY SYSTEM**

Y. K. CHOO Oct. 1983 21 p

(NASA-TP-2172; E-1465; NAS 1.60:2172) Avail: NTIS HC

A02/MF A01 CSCL 10B

COAL GASIFICATION, COMBINED CYCLE POWER GENERATION, STEAM TURBINES

**N84-21977\*#** National Aeronautics and Space Administration, Washington, D.C.

### **ENERGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, ISSUE 40, JANUARY 1984**

Jan. 1984 212 p

(NASA-SP-7043(40); NAS 1.21:7043(40)) Avail: NTIS HC

\$15.00 CSCL 10A

This bibliography lists 775 reports, articles and other documents introduced into the NASA scientific and technical information system from October 1, 1983 through December 31, 1983.

A.R.H.

**N84-29307\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SPACE PHOTOVOLTAIC RESEARCH AND TECHNOLOGY 1983. HIGH EFFICIENCY, RADIATION DAMAGE, AND BLANKET TECHNOLOGY**

Washington, D.C. 1984 266 p refs Conf. held in Cleveland, 18-20 Oct. 1983

(NASA-CP-2314; E-2005; NAS 1.55:2314) Avail: NTIS HC

A12/MF A01 CSCL 10A

CONFERENCES, RADIATION DAMAGE, SOLAR BLANKETS, SPACECRAFT POWER SUPPLIES

**N86-17839\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **SPACE PHOTOVOLTAIC RESEARCH AND TECHNOLOGY 1985: HIGH EFFICIENCY, SPACE ENVIRONMENT, AND ARRAY TECHNOLOGY**

1985 282 p refs Conference held in Cleveland, Ohio, 30 Apr. - 2 May 1985

(NASA-CP-2408; E-2706; NAS 1.55:2408) Avail: NTIS HC

A13/MF A01 CSCL 10A

AEROSPACE ENVIRONMENTS, EFFICIENCY, PHOTOVOLTAIC CELLS, SOLAR ARRAYS, SOLAR CELLS, SPACECRAFT POWER SUPPLIES

## ENVIRONMENT POLLUTION

Includes atmospheric, noise, thermal, and water pollution.

**N77-32622\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN ULTRAVIOLET VIDEO TECHNIQUE FOR VISUALIZATION OF STACK PLUMES AND FOR MEASURING SULFUR DIOXIDE CONCENTRATION AND EFFLUENT VELOCITY**

R. J. EXTON Sep. 1977 38 p refs  
(NASA-TP-1014; L-11628) Avail: NTIS HC A03/MF A01  
CSCL 13B

PLUMES, SULFUR OXIDES, ULTRAVIOLET PHOTOGRAPHY, VIDEO EQUIPMENT

**N78-11517\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**RESEARCH IN THE USE OF ELECTRETS IN MEASURING EFFLUENTS FROM ROCKET EXHAUST OF THE SPACE SHUTTLE (6.4 PERCENT SCALED MODEL) AND VIKING 1 LAUNCH**

M. SUSKO Nov. 1977 122 p refs  
(NASA-TP-1073; M-231) Avail: NTIS HC A06/MF A01  
CSCL 13B

ELECTRETS, ROCKET EXHAUST, SPACE SHUTTLES, VIKING 1 SPACECRAFT

**N78-11520\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SOME PHYSICAL AND THERMODYNAMIC PROPERTIES OF ROCKET EXHAUST CLOUDS MEASURED WITH INFRARED SCANNERS**

R. I. GOMBERG, A. G. KANTSIOS, and F. J. ROSENSTEEL Nov. 1977 32 p refs  
(NASA-TP-1041; L-11742) Avail: NTIS HC A03/MF A01  
CSCL 13B

INFRARED SCANNERS, ROCKET EXHAUST, THERMODYNAMIC PROPERTIES

**N78-12554\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LABORATORY MEASUREMENTS OF RADIANCE AND REFLECTANCE SPECTRA OF DILUTE PRIMARY-TREATED SEWAGE SLUDGE**

J. W. USRY, W. G. WITTE, C. H. WHITLOCK, and E. A. GURGANUS Nov. 1977 27 p refs  
(NASA-TP-1038; L-11767) Avail: NTIS HC A03/MF A01  
CSCL 13B

RADIANCE, REFLECTANCE, SEWAGE TREATMENT

**N78-12555\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LABORATORY MEASUREMENTS OF RADIANCE AND REFLECTANCE SPECTRA OF DILUTE SECONDARY-TREATED SEWAGE SLUDGE**

W. G. WITTE, J. W. USRY, C. H. WHITLOCK, and E. A. GURGANUS Dec. 1977 23 p refs  
(NASA-TP-1089; L-11870) Avail: NTIS HC A02/MF A01  
CSCL 13B

OCEANS, REMOTE SENSORS, WASTE DISPOSAL

**N78-13628\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**QUANTITATIVE ANALYSIS OF AIRCRAFT MULTISPECTRAL-SCANNER DATA AND MAPPING OF WATER-QUALITY PARAMETERS IN THE JAMES RIVER IN VIRGINIA**

R. W. JOHNSON and G. S. BAHN (Vought Corp., Hampton, Va.) Dec. 1977 33 p refs  
(NASA-TP-1021; L-10968) Avail: NTIS HC A03/MF A01  
CSCL 13B

MULTISPECTRAL BAND SCANNERS, QUANTITATIVE ANALYSIS, RIVERS, VIRGINIA, WATER QUALITY

**N78-15596\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF ENTRAINED WATER AND STRONG TURBULENCE ON AFTERBURNING WITHIN SOLID ROCKET MOTOR PLUMES**

R. I. GOMBERG and R. G. WILMOTH Jan. 1978 39 p refs  
(NASA-TP-1111; L-11875) Avail: NTIS HC A03/MF A01  
CSCL 21H

AFTERBURNING, EXHAUST GASES, ROCKET EXHAUST, SPACE SHUTTLES

**N78-20654\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**WATER-VAPOR PRESSURE CONTROL IN A VOLUME**

J. J. SCIALDONE Mar. 1978 20 p refs  
(NASA-TP-1172; G-7802-F6) Avail: NTIS HC A02/MF A01  
CSCL 13B

PURGING, SPACECRAFT CABIN ATMOSPHERES, WATER VAPOR

**N78-28682\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THERMODYNAMIC AND CHEMICAL PARAMETERS OF THE EXHAUST EFFLUENTS FROM THE HARPOON BOOSTER MOTOR**

J. B. STEPHENS and A. I. GOLDFORD (Science Applications, Inc., Huntsville, Ala.) Jul. 1978 49 p refs  
(NASA-TP-1280; M-257) Avail: NTIS HC A03/MF A01  
CSCL 13B

BOOSTER ROCKET ENGINES, COMBUSTION PRODUCTS, EXHAUST GASES, HARPOON MISSILE

**N78-33616\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LABORATORY AND FIELD MEASUREMENTS OF UPWELLED RADIANCE AND REFLECTANCE SPECTRA OF SUSPENDED JAMES RIVER SEDIMENTS NEAR HOPEWELL, VIRGINIA**

C. H. WHITLOCK, W. G. WITTE, E. A. GURGANUS, and J. W. USRY Oct. 1978 30 p refs  
(NASA-TP-1292; L-12298) Avail: NTIS HC A03/MF A01  
CSCL 13B

SEDIMENTS, SPECTRAL REFLECTANCE, UPWELLING WATER, VIRGINIA, WATER POLLUTION

**N78-33617\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**QUANTITATIVE MAPPING BY REMOTE SENSING OF AN OCEAN ACID-WASTE DUMP**

C. W. OHLHORST Oct. 1978 27 p refs  
(NASA-TP-1275; L-11927) Avail: NTIS HC A02/MF A01  
CSCL 13B

ACIDS, ENVIRONMENTAL SURVEYS, MAPPING, OCEAN SURFACE, QUANTITATIVE ANALYSIS, REMOTE SENSORS, WATER POLLUTION

## 45 ENVIRONMENT POLLUTION

**N78-33618\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

### **OZONE CONCENTRATION IN THE CABIN OF A GATES LEAR-JET MEASURED SIMULTANEOUSLY WITH ATMOSPHERIC OZONE CONCENTRATIONS**

D. BRIEHL and P. J. PERKINS Oct. 1978 20 p refs  
(NASA-TP-1340; E-9653) Avail: NTIS HC A02/MF A01 CSCL 13B

AIRCRAFT COMPARTMENTS, ATMOSPHERIC COMPOSITION, CABIN ATMOSPHERES, CONCENTRATION (COMPOSITION), LEAR JET AIRCRAFT, OZONOMETRY

**N79-14591\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

### **DESCRIPTION AND FIELD TEST OF AN IN SITU COLIFORM MONITORING SYSTEM**

D. C. GRANA and J. R. WILKINS Jan. 1979 37 p refs  
(NASA-TP-1334; L-12361) Avail: NTIS HC A03/MF A01 CSCL 13B

BACTERIA, POLLUTION MONITORING, SAMPLING

**N79-17360\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

### **LABORATORY MEASUREMENTS OF RADIANCE AND REFLECTANCE SPECTRA OF A DILUTE BIOSOLID INDUSTRIAL WASTE PRODUCT**

J. W. USRY, W. G. WITTE, C. H. WHITLOCK, and E. A. GURGANUS Feb. 1979 23 p refs  
(NASA-TP-1401; L-12641) Avail: NTIS HC A02/MF A01 CSCL 13B

INDUSTRIAL WASTES, RADIANCE, REFLECTANCE, SLUDGE, SPECTRAL SIGNATURES

**N79-18479\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

### **CONDENSATION-NUCLEI (AITKEN PARTICLE) MEASUREMENT SYSTEM USED IN NASA GLOBAL ATMOSPHERIC SAMPLING PROGRAM**

T. W. NYLAND Feb. 1979 28 p refs  
(NASA-TP-1415; E-9816) Avail: NTIS HC A03/MF A01 CSCL 13B

AITKEN NUCLEI, CALIBRATING, CONDENSING, GLOBAL ATMOSPHERIC RESEARCH PROGRAM, MEASURING INSTRUMENTS, POLLUTION MONITORING

**N79-22654\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

### **OZONE MEASUREMENT SYSTEM FOR NASA GLOBAL AIR SAMPLING PROGRAM**

M. W. TIEFERMANN May 1979 21 p refs  
(NASA-TP-1451; E-9829) Avail: NTIS HC A02/MF A01 CSCL 13B

AIR POLLUTION, CONCENTRATION (COMPOSITION), GLOBAL AIR SAMPLING PROGRAM, OZONE

**N79-28796\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

### **EFFECTS OF ROAD TRAFFIC BACKGROUND NOISE ON JUDGMENTS OF INDIVIDUAL AIRPLANE NOISES Ph.D. Thesis**

C. A. POWELL Jul. 1979 44 p refs  
(NASA-TP-1433; L-12651) Avail: NTIS HC A03/MF A01 CSCL 13B

AIRCRAFT NOISE, BACKGROUND NOISE, NOISE MEASUREMENT, PSYCHOACOUSTICS

**N79-29679\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

### **SPATIAL-FREQUENCY RESPONSE OF THE LIMB INFRARED MONITOR OF THE STRATOSPHERE**

R. G. WILSON, A. JALINK, JR., and W. M. KAHLBAUM, JR. Aug. 1979 52 p refs  
(NASA-TP-1504; L-13037) Avail: NTIS HC A04/MF A01 CSCL 13B

FREQUENCY RESPONSE, INFRARED SCANNERS, STRATOSPHERE

**N79-30844\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

### **PROGRAMS FOR CALCULATING CELL PARAMETERS IN ELECTRON AND X-RAY DIFFRACTION**

G. POLKOWSKI (LFE Corp., Richmond, Calif.), K. G. SNETSINGER, and N. H. FARLOW Aug. 1979 57 p refs  
(NASA-TP-1529; A-7761) Avail: NTIS HC A04/MF A01 CSCL 13B

AEROSOLS, COMPUTER PROGRAMS, DIFFRACTION PATTERNS, ELECTRON DIFFRACTION, STRATOSPHERE, X RAY DIFFRACTION

**N79-31841\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

### **CARBON MONOXIDE MEASUREMENT IN THE GLOBAL ATMOSPHERIC SAMPLING PROGRAM**

T. J. DUDZINSKI Sep. 1979 26 p refs  
(NASA-TP-1526; E-9972) Avail: NTIS HC A03/MF A01 CSCL 13B

CARBON MONOXIDE, GLOBAL AIR SAMPLING PROGRAM, MEASURING INSTRUMENTS, POLLUTION MONITORING

**N79-32743\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

### **LABORATORY STUDY OF ANNOYANCE TO COMBINED AIRPLANE AND ROAD-TRAFFIC NOISE**

C. A. POWELL Washington Sep. 1979 40 p refs  
(NASA-TP-1478; L-12977) Avail: NTIS HC A03/MF A01 CSCL 13B

ACOUSTIC SIMULATION, AIRCRAFT NOISE, HUMAN TOLERANCES, NOISE POLLUTION, NOISE TOLERANCE

**N79-32744\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

### **A SUMMATION AND INHIBITION MODEL OF ANNOYANCE RESPONSE TO MULTIPLE COMMUNITY NOISE SOURCES**

C. A. POWELL Washington Sep. 1979 23 p refs  
(NASA-TP-1479; L-12978) Avail: NTIS HC A02/MF A01 CSCL 13B

COMMUNITIES, MATHEMATICAL MODELS, NOISE POLLUTION, NOISE REDUCTION

**N79-33611\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

### **MEASUREMENT TECHNIQUES FOR TRACE METALS IN COAL-PLANT EFFLUENTS: A BRIEF REVIEW**

J. J. SINGH Washington Oct. 1979 34 p refs  
(NASA-RP-1047; L-13164) Avail: NTIS HC A03/MF A01 CSCL 13B

The strong features and limitations of techniques for determining trace elements in aerosols emitted from coal plants are discussed. Techniques reviewed include atomic absorption spectroscopy, charged particle scattering and activation, instrumental neutron activation analysis, gas/liquid chromatography, gas chromatographic/mass spectrometric methods, X-ray fluorescence, and charged-particle-induced X-ray emission. The latter two methods are emphasized. They provide simultaneous, sensitive multielement analyses and lend themselves readily to depth profiling. It is recommended that whenever feasible, two or more complementary techniques should be used for analyzing environmental samples. K.L.



**N80-14581\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SULFATE AND NITRATE COLLECTED BY FILTER SAMPLING NEAR THE TROPOPAUSE**

F. M. HUMENIK, E. A. LEZBERG, and D. A. OTTERSON Jan. 1980 30 p refs  
(NASA-TP-1567; E-073) Avail: NTIS HC A03/MF A01 CSCL 13B

AIR POLLUTION, AIR SAMPLING, NITRATES, SULFATES, TROPOPAUSE

**N80-15649\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**PROCEEDINGS OF SHUTTLE ENVIRONMENTAL EFFECTS PROGRAM REVIEW**

A. E. POTTER, ed. Washington Jan. 1980 124 p refs  
Conf. held at Kennedy Space Center, Fla., 21-22 Mar. 1978  
(NASA-CP-2110; S-489) Avail: NTIS HC A06/MF A01 CSCL 13B

CONFERENCES, ECOLOGY, ROCKET EXHAUST, SOLID PROPELLANT ROCKET ENGINES, SPACE SHUTTLES

**N80-27832\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COORDINATED AIRCRAFT AND SHIP SURVEYS FOR DETERMINING IMPACT OF RIVER INPUTS ON GREAT LAKES WATERS. REMOTE SENSING RESULTS**

C. A. RAQUET, J. A. SALZMAN, T. A. CONEY, R. A. SVEHLA, D. F. SHOOK, and R. T. GEDNEY Jul. 1980 105 p refs  
(NASA-TP-1694; E-172) Avail: NTIS HC A06/MF A01 CSCL 13B

EFFLUENTS, LAKE ERIE, LAKE MICHIGAN, LAKE ONTARIO, LAKE SUPERIOR, POLLUTION MONITORING

**N80-28946\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANNOYANCE DUE TO MULTIPLE AIRPLANE NOISE EXPOSURE**

C. A. POWELL Aug. 1980 42 p refs  
(NASA-TP-1706; L-13710) Avail: NTIS HC A03/MF A01 CSCL 13B

AIRCRAFT NOISE, HUMAN FACTORS ENGINEERING, HUMAN REACTIONS, NOISE POLLUTION

**N80-29911\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF CONVERSATION INTERFERENCE ON ANNOYANCE DUE TO AIRCRAFT NOISE**

K. F. KEY and C. A. POWELL Aug. 1980 38 p refs  
(NASA-TP-1712; L-13709) Avail: NTIS HC A03/MF A01 CSCL 13B

AIRCRAFT NOISE, CONVERSATION, INTERFERENCE, NOISE TOLERANCE

**N81-11565\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL STUDY OF CLUSTER FORMATION IN BINARY MIXTURE OF H<sub>2</sub>O AND H<sub>2</sub>SO<sub>4</sub> VAPORS IN THE PRESENCE OF AN IONIZING RADIATION SOURCE**

J. J. SINGH, A. C. SMITH, and G. K. YUE (Inst. for Atmospheric Optics and Remote Sensing, Hampton, Va.) Nov. 1980 30 p refs  
(NASA-TP-1735; L-13878) Avail: NTIS HC A03/MF A01 CSCL 13B

IONIZING RADIATION, MOLECULAR INTERACTIONS, NITROGEN, SPECTROSCOPIC ANALYSIS, SULFURIC ACID, WATER

**N81-17622\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**TWO-DIMENSIONAL MODEL STUDIES OF THE EFFECT OF SUPERSONIC AIRCRAFT OPERATIONS ON THE STRATOSPHERIC OZONE CONTENT**

R. C. WHITTEN, W. J. BORUCKI, I. G. POPPOFF (Flick Point Associates, Carmel Bay, Calif.), L. LATT (Aerospace Corp., El Segundo, Calif.), G. F. WIDHOPF (Aerospace Corp., El Segundo, Calif.), L. A. CAPONE (San Jose State Univ.), and C. A. REIGEL (San Jose State Univ.) Feb. 1981 72 p refs  
(NASA-RP-1064; A-8270) Avail: NTIS HC A04/MF A01 CSCL 13B

For a fleet of 250 aircraft, the change in the ozone column is predicted to be very close to zero; in fact, the ozone overburden may actually increase as a result of show that above 25 to 30 km the ozone abundance decreases via catalytic destruction, but at lower heights it increases, mainly as a result of coupling with odd hydrogen species. Water vapor released in the engine exhaust is predicted to cause ozone decreases; for the hypothetical engines used in the study, the total column ozone changes due to water vapor emission largely offset the predicted ozone increases due to NO<sub>x</sub> emission. The actual effect of water vapor may be less than calculated because present models do not include thermal feedback. Feedback refers to the cooling effect of additional water vapor that would tend to slow the NO<sub>x</sub> reactions which destroy ozone. T.M.

**N81-22587\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A DIAGNOSTIC MODEL FOR STUDYING DAYTIME URBAN AIR QUALITY TRENDS**

D. A. BREWER (George Washington Univ., Hampton, Va.), E. E. REMSBERG, and G. E. WOODBURY May 1981 43 p refs  
(NASA-TP-1843; L-14251) Avail: NTIS HC A03/MF A01 CSCL 13B

AIR QUALITY, ATMOSPHERIC MODELS, PHOTOCHEMICAL REACTIONS, POLLUTION MONITORING, SMOG, URBAN RESEARCH

**N81-24601\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYTIC MODEL FOR WASHOUT OF HCL(G) FROM DISPERSING ROCKET EXHAUST CLOUDS**

G. L. PELLETT May 1981 92 p refs  
(NASA-TP-1801; L-14107) Avail: NTIS HC A05/MF A01 CSCL 13B

ACID RAIN, CHEMICAL CLOUDS, ENVIRONMENT POLLUTION, HYDROGEN CHLORIDES, MATHEMATICAL MODELS, ROCKET EXHAUST

**N82-12654\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF ACTIVITY INTERFERENCE ON ANNOYANCE DUE TO AIRCRAFT NOISE**

K. F. WILLSHIRE and C. A. POWELL Nov. 1981 29 p refs  
(NASA-TP-1938; L-14808) Avail: NTIS HC A03/MF A01 CSCL 13B

AIRCRAFT NOISE, HUMAN REACTIONS, NOISE POLLUTION, PSYCHOACOUSTICS

**N82-14672\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPLICATION OF A GAUSSIAN MULTILAYER DIFFUSION MODEL TO CHARACTERIZE DISPERSION OF VERTICAL HCL COLUMN DENSITY IN ROCKET EXHAUST CLOUDS**

G. L. PELLETT and W. L. STATON Dec. 1981 74 p refs  
(NASA-TP-1956; L-14715) Avail: NTIS HC A04/MF A01 CSCL 13B

AIR POLLUTION, ATMOSPHERIC EFFECTS, FLORIDA, HYDROGEN CHLORIDES, ROCKET EXHAUST, SOLID ROCKET PROPELLANTS, VERTICAL DISTRIBUTION

## 45 ENVIRONMENT POLLUTION

**N82-19707\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EFFECTS OF REPETITION RATE AND IMPULSIVENESS OF SIMULATED HELICOPTER ROTOR NOISE ON ANNOYANCE**  
C. A. POWELL and D. A. MCCURDY Feb. 1982 59 p refs  
(NASA-TP-1969; L-14936) Avail: NTIS HC A04/MF A01 CSCL 20A  
AIRCRAFT NOISE, HELICOPTERS, NOISE TOLERANCE, PRESSURE PULSES, PULSE RATE, ROTARY WINGS

**N82-21774\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**LABORATORY UPWELLED RADIANCE AND REFLECTANCE SPECTRA OF KERR RESERVOIR SEDIMENT WATERS**  
W. G. WITTE, C. H. WHITLOCK, W. D. MORRIS, and E. A. GURGANUS Mar. 1982 22 p refs  
(NASA-TP-1993; L-14992; NAS 1.60:1993) Avail: NTIS HC A02/MF A01 CSCL 13B  
RADIANCE, RESERVOIRS, SEDIMENTS, SPECTRAL REFLECTANCE, UPWELLING WATER

**N82-27867\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**CALCULATION OF COMPOSITION DISTRIBUTION OF ULTRAFINE ION-H<sub>2</sub>O-H<sub>2</sub>SO<sub>4</sub> CLUSTERS USING A MODIFIED BINARY ION NUCLEATION THEORY**  
J. J. SINGH, A. S. SMITH, L. Y. CHAN (Institute for Atmospheric Optics and Remote Sensing), and G. K. YUE (Institute for Atmospheric Optics and Remote Sensing) Jun. 1982 24 p refs  
(NASA-TP-2031; L-1533; NAS 1.60:2031) Avail: NTIS HC A02/MF A01 CSCL 13B  
CLUMPS, IONS, NUCLEATION

**N82-28839\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SIMPLIFIED FREE-ENERGY CALCULATION FOR ION-INDUCED HETEROMOLECULAR NUCLEATION**  
J. J. SINGH, A. C. SMITH, L. Y. CHAN (Inst. for Atmospheric Optics and Remote Sensing), and G. K. YUE (Inst. for Atmospheric Optics and Remote Sensing) Jul. 1982 22 p refs  
(NASA-TP-2039; L-15392; NAS 1.60:2039) Avail: NTIS HC A02/MF A01 CSCL 13B  
CLUMPS, GIBBS FREE ENERGY, NUCLEATION

**N83-12595\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**CHARACTERIZATION OF SOIL AND POSTLAUNCH PAD DEBRIS FROM CAPE CANAVERAL LAUNCH COMPLEX AND ANALYSIS OF SOIL INTERACTION WITH AQUEOUS HCL**  
G. L. PELLETT, L. W. SPANGLER, R. W. STOREY, and R. J. BENDURA Oct. 1982 26 p refs Presented at an Environ. Effects Program Review at Cocoa Beach, Fla., Mar. 1978  
(NASA-TP-2076; L-15433; NAS 1.60:2076) Avail: NTIS HC A03/MF A01 CSCL 13B  
DEBRIS, FRACTIONATION, HYDROCHLORIC ACID, LAUNCHING PADS, QUARTZ, ROCKET EXHAUST, SOIL MAPPING, SOIL MECHANICS

**N83-13643\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**WATER VAPOR MEASUREMENT SYSTEM IN GLOBAL ATMOSPHERIC SAMPLING PROGRAM, APPENDIX**  
D. R. ENGLUND and T. J. DUDZINSKI Nov. 1982 18 p refs  
(NASA-TP-2051; E-1167; NAS 1.60:2051) Avail: NTIS HC A02/MF A01 CSCL 13B  
DEW, FROST, GLOBAL AIR SAMPLING PROGRAM, MOISTURE CONTENT, POLLUTION MONITORING, WATER VAPOR

**N83-16951\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**MULTIPLE-EVENT AIRPLANE NOISE ANNOYANCE**  
C. A. POWELL Jan. 1983 34 p refs  
(NASA-TP-2101; L-15517; NAS 1.60:2101) Avail: NTIS HC A03/MF A01 CSCL 13B  
AIRCRAFT NOISE, AUDITORY STIMULI, PHYSIOLOGICAL FACTORS, PSYCHOACOUSTICS, PSYCHOLOGICAL EFFECTS

**N83-16952\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AIRBORNE MEASUREMENTS OF LAUNCH VEHICLE EFFLUENT: LAUNCH OF SPACE SHUTTLE (STS-1) ON 12 APRIL 1981**  
G. L. GREGORY, D. C. WOODS, and D. I. SEBACHER Jan. 1983 74 p refs  
(NASA-TP-2090; L-15494; NAS 1.60:2090) Avail: NTIS HC A04/MF A01 CSCL 13B  
EFFLUENTS, ENVIRONMENT EFFECTS, HYDROGEN CHLORIDES, ROCKET EXHAUST, SPACE TRANSPORTATION SYSTEM 1 FLIGHT, SPACECRAFT LAUNCHING

**N84-18764\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AIRBORNE MEASUREMENTS OF LAUNCH VEHICLE EFFLUENT OF STS-2 LAUNCH ON NOVEMBER 12, 1981 AT CAPE CANAVERAL, FLORIDA**  
G. L. MADDREA, JR., G. L. GREGORY, D. I. SEBACHER, and D. C. WOODS Feb. 1984 47 p refs  
(NASA-TP-2260; L-15715; NAS 1.60:2260) Avail: NTIS HC A03/MF A01 CSCL 13B  
AIR QUALITY, CORRELATION, EXHAUST EMISSION, FLORIDA, LIGHT SCATTERING, SAMPLING, SPACE SHUTTLES

**N86-16748\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AIRBORNE LIDAR MEASUREMENTS OF AEROSOLS, MIXED LAYER HEIGHTS, AND OZONE DURING THE 1980 PEPE/NEROS SUMMER FIELD EXPERIMENT**  
E. V. BROWELL, S. T. SHIPLEY, C. F. BUTLER (Old Dominion Univ., Norfolk, Va.), and S. ISMAIL (SASC Technologies, Inc., Hampton, Va.) Dec. 1985 197 p refs  
(NASA-RP-1143; L-15943; NAS 1.61:1143) Avail: NTIS HC A09/MF A01 CSCL 13B

A detailed summary of the NASA Ultraviolet Differential Absorption Lidar (UV DIAL) data archive obtained during the EPA Persistent Elevated Pollution Episode/Northeast Regional Oxidant Study (PEPE/NEROS) Summer Field Experiment Program (July through August 1980) is presented. The UV dial data set consists of remote measurements of mixed layer heights, aerosol backscatter cross sections, and sequential ozone profiles taken during 14 long-range flights onboard the NASA Wallops Flight Center Electra aircraft. These data are presented in graphic and tabular form, and they have been submitted to the PEPE/NEROS data archive on digital magnetic tape. The derivation of mixing heights and ozone profiles from UV Dial signals is discussed, and detailed intercomparisons with measurements obtained by in situ sensors are presented.

Author

## GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

**N77-15563\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ATMOSPHERIC AEROSOLS: THEIR OPTICAL PROPERTIES AND EFFECTS**

1976 316 p refs Conf. proc. held at Williamsburg, Va., 13-15 Dec. 1976; Sponsored by NASA Langley Research Center and the Optical Soc. of Am.

(NASA-CP-2004) Avail: NTIS HC A14/MF A01 CSCL 04A  
AEROSOLS, HUMIDITY, OPTICAL PROPERTIES

**N77-15564\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ATMOSPHERIC AEROSOLS: THEIR OPTICAL PROPERTIES AND EFFECTS (SUPPLEMENT)**

1976 46 p refs Conf. proc. held at Williamsburg, Va., 13-15 Dec. 1976; sponsored by NASA Langley Research Center and the Optical Soc. of Am.

(NASA-CP-2004-SUPPL) Avail: NTIS HC A03/MF A01 CSCL 04A

AEROSOLS, ATMOSPHERIC EFFECTS, ATMOSPHERIC REFRACTION, CONFERENCES, OPTICAL PROPERTIES

**N77-31694\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**CHLOROFLUOROMETHANES AND THE STRATOSPHERE**

R. D. HUDSON, ed. Aug. 1977 268 p refs Workshop held at Warrenton, Va., 10 Jan. 1977

(NASA-RP-1010; G-7725) Avail: NTIS HC A12/MF A01 CSCL 04A

The conclusions of a workshop held by the National Aeronautics and Space Administration to assess the current knowledge of the impact of chlorofluoromethane release in the troposphere on stratospheric ozone concentrations. The following topics are discussed; (1) Laboratory measurements; (2) Ozone measurements and trends; (3) Minor species and aerosol measurements; (4) One dimensional modeling; and (5) Multidimensional modeling.

**N78-11545\*#** National Aeronautics and Space Administration, Washington, D.C.

**NATIONAL GEODETIC SATELLITE PROGRAM, PART 1 Final Report**

S. W. HENRIKSEN, ed. (Am. Geophys. Union) 1977 523 p refs 2 Vol.

(NASA-SP-365-PT-1) Avail: NTIS MF A01; SOD HC CSCL 04A

The work performed by individual contributors to the National Geodetic Satellite Program is presented. The purpose of the organization, the instruments used in obtaining the data, a description of the data itself, the theory used in processing the data, and evaluation of the results are detailed for the participating organizations. For individual titles, see N78-11546 through N78-11551.

**N78-11552\*#** National Aeronautics and Space Administration, Washington, D.C.

**NATIONAL GEODETIC SATELLITE PROGRAM, PART 2 Final Report**

1977 509 p refs 2 Vol.

(NASA-SP-365-PT-2) Avail: NTIS MF A01; SOD HC CSCL 04A

The work performed by individual contributors to the National Geodetic Satellite Program is presented. The purpose of the specific organization, the instruments used in obtaining the data, a description of the data itself, the theory used in processing the data, and evaluation of the results are detailed for each participating

organization. An overall evaluation of the entire program is given. For individual titles, see N78-11553 through N78-11557.

**N78-12586\*#** National Aeronautics and Space Administration, Washington, D.C.

**INVERSION METHODS IN ATMOSPHERIC REMOTE SOUNDING**

A. DEEPAK, ed. 1977 609 p refs Workshop held at Hampton, Va., 15-17 Dec. 1976 Sponsored in part by Old Dominion Univ.

(NASA-CP-004) Avail: NTIS HC A99/MF A01 CSCL 04A

APPLICATIONS OF MATHEMATICS, ATMOSPHERIC COMPOSITION, CONFERENCES, DATA PROCESSING, INVERSIONS, REMOTE SENSORS

**N78-21690\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**MICROWAVE EMISSION FROM POLAR FIRN**

A. T. C. CHANG and B. J. CHOUDHURY (Computer Sciences Corp., Silver Spring, Md.) Apr. 1978 24 p refs

(NASA-TP-1212) Avail: NTIS HC A02/MF A01 CSCL 04A  
MICROWAVE EMISSION, POLAR CAPS, SNOW COVER

**N78-21691\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ON THE TIDAL OSCILLATIONS OF THE LIQUID CORE OF THE EARTH**

P. MUSEN Apr. 1978 71 p refs

(NASA-TP-1223; G-7802-F11) Avail: NTIS HC A04/MF A01 CSCL 08K

EARTH CORE, LIQUIDS, TIDES

**N78-26677\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ESTIMATION OF SNOW TEMPERATURE AND MEAN CRYSTAL RADIUS FROM REMOTE MULTISPECTRAL PASSIVE MICROWAVE MEASUREMENTS**

A. T. C. CHANG Jun. 1978 15 p refs

(NASA-TP-1251) Avail: NTIS HC A02/MF A01 CSCL 08L

MICROWAVES, RADIOMETERS, RAYLEIGH SCATTERING, SNOW COVER, TEMPERATURE MEASUREMENT

**N78-29669\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**EXPLORATORY MEETING ON ATMOSPHERIC ELECTRICITY AND SEVERE STORMS**

W. W. VAUGHAN, ed. Jul. 1978 30 p refs Meeting held at Huntsville, Ala., 10-11 Apr. 1978

(NASA-CP-2056) Avail: NTIS HC A03/MF A01 CSCL 04A

ATMOSPHERIC ELECTRICITY, CONFERENCES, STORMS (METEOROLOGY)

**N79-10634\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MAN'S IMPACT ON THE TROPOSPHERE: LECTURES IN TROPOSPHERIC CHEMISTRY**

J. S. LEVINE, ed. and D. R. SCHRYER, ed. Sep. 1978 371 p refs Lectures held at Hampton, Va., 1977

(NASA-RP-1022; L-12142) Avail: NTIS HC A16/MF A01 CSCL 04A

Lectures covering a broad spectrum of current research in tropospheric chemistry with particular emphasis on the interaction of measurements, modeling, and understanding of fundamental processes are presented. For individual titles, see N79-10635 through N79-10644.

**N79-13601\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**OGO PROGRAM SUMMARY, SUPPLEMENT 1**

J. E. JACKSON Jun. 1978 119 p

(NASA-SP-7601-SUPPL-1) Avail: NTIS HC A06 CSCL 04A

Scientific results from OGO-5 and OGO-6 experiments are summarized and approximately 200 citations are included to update the 1975 OGO bibliography. Personal author, subject, and corporate

source indexes are included. The supplement follows the same format as that of the OGO Program Summary; it does not repeat the finalized information in the original publication, which should be consulted for indexes of experiments, experimenters, institutions, and the glossary of abbreviations and acronyms. A.R.H.

**N79-13607\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**ATMOSPHERIC EFFECTS ON CO<sub>2</sub> LASER PROPAGATION**

S. S. R. MURTY (Alabama A and M Univ., Normal) and J. W. BILBRO Nov. 1978 107 p refs  
(NASA-TP-1357; M-269) Avail: NTIS HC A06/MF A01 CSCL 04A

ATMOSPHERIC EFFECTS, CARBON DIOXIDE LASERS, LASER OUTPUTS, TRANSMISSION, WAVE PROPAGATION

**N79-16473\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PRELIMINARY RESULTS OF SAR SOIL MOISTURE EXPERIMENT, NOVEMBER 1975**

B. J. CHOUDHURY, A. T. C. CHANG, T. J. SCHMUGGE, V. V. SALOMONSON, and J. R. WANG Jan. 1979 21 p refs  
(NASA-TP-1404; G-7802-F21) Avail: NTIS HC A02/MF A01 CSCL 08M

REMOTE SENSORS, SOIL MOISTURE, SYNTHETIC APERTURE RADAR

**N79-17388\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LIDAR BACKSCATTERING MEASUREMENTS OF BACKGROUND STRATOSPHERIC AEROSOLS**

E. E. REMSBERG, G. B. NORTHAM, and C. F. BUTLER (Old Dominion Univ.) Feb. 1979 35 p refs  
(NASA-TP-1381; L-12292) Avail: NTIS HC A03/MF A01 CSCL 04A

AEROSOLS, BACKSCATTERING, OPTICAL RADAR, POLLUTION MONITORING, STRATOSPHERE

**N79-19519\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PRELIMINARY RESULTS OF PASSIVE MICROWAVE SNOW EXPERIMENT DURING FEBRUARY AND MARCH 1978**

A. T. C. CHANG, J. C. SHIUE, H. BOYNE (NBS, Boulder, Colo.), D. ELLERBRUCH (NBS, Boulder, Colo.), G. COUNAS (NBS, Boulder, Colo.), R. WITTMANN (NBS, Boulder, Colo.), and R. JONES (NBS, Boulder, Colo.) Mar. 1979 114 p refs  
(NASA-TP-1408; REPT-7802-F22) Avail: NTIS HC A06/MF A01 CSCL 04A

MICROWAVE RADIOMETERS, MULTISPECTRAL BAND SCANNERS, SNOW COVER

**N79-25608\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**MIDDLE ATMOSPHERE ELECTRODYNAMICS: REPORT OF THE WORKSHOP ON THE ROLE OF THE ELECTRODYNAMICS OF THE MIDDLE ATMOSPHERE ON SOLAR TERRESTRIAL COUPLING**

N. C. MAYNARD, ed. Jun. 1979 268 p refs Workshop held at Reston, Va., 17-19 Jan. 1979  
(NASA-CP-2090) Avail: NTIS HC A12/MF A01 CSCL 04A

ATMOSPHERIC ELECTRICITY, CONFERENCES, COUPLING, ELECTRIC FIELDS, ELECTRODYNAMICS, MIDLATITUDE ATMOSPHERE, TERRESTRIAL RADIATION

**N79-30869\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**PROCEEDINGS: WORKSHOP ON THE NEED FOR LIGHTNING OBSERVATIONS FROM SPACE**

L. S. CHRISTENSEN, ed., W. FROST, ed., and W. W. VAUGHAN, ed. Jul. 1979 255 p refs Workshop held at Tullahoma, Tenn., 13-15 Feb. 1979 Supersedes NASA-CP-2083; N79-21697 Prepared in cooperation with Tenn. Univ. Space Inst., Tullahoma (NASA-CP-2095) Avail: NTIS HC A12/MF A01 CSCL 04A

CONFERENCES, LIGHTNING, REMOTE SENSORS, SATELLITE OBSERVATION, SATELLITE-BORNE INSTRUMENTS

**N79-31864\*#** National Aeronautics and Space Administration. Washington, D.C.

**APPLICATION OF SPACE TECHNOLOGY TO CRUSTAL DYNAMICS AND EARTHQUAKE RESEARCH**

Aug. 1979 274 p refs  
(NASA-TP-1464) Avail: NTIS HC A12/MF A01 CSCL 08K  
EARTH CRUST, EARTHQUAKES, GEODESY, GEOPHYSICS, TECHNOLOGY UTILIZATION

**N80-13730\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN ASYMPTOTIC EXPANSION APPROACH TO THE INVERSE RADIATIVE TRANSFER PROBLEM**

R. I. GOMBERG and J. J. BUGLIA Washington Dec. 1979 32 p refs  
(NASA-TP-1587; L-13165) Avail: NTIS HC A03/MF A01 CSCL 04A

ASYMPTOTIC SERIES, ATMOSPHERIC COMPOSITION, CONCENTRATION (COMPOSITION), RADIATIVE TRANSFER

**N80-23912\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**VOLCANIC FEATURES OF HAWAII. A BASIS FOR COMPARISON WITH MARS**

M. H. CARR (U.S. Geological Survey, Menlo Park, Calif.) and R. GREELEY Washington 1980 216 p refs Original contains color illustrations  
(NASA-SP-403; LC-80-600024) Avail: NTIS MF A01; SOD HC \$14.00 CSCL 08K

Despite the difference in size Martian and Hawaiian volcanoes have numerous characteristics in common. Specific features such as lava channels, collapsed lava tubes, levees and flow fronts, all very common in Hawaii, are also abundant on the flanks of some of the Martian volcanoes. Striking differences also exist, such as the apparent lack of radial rift zones on some Martian volcanoes and the paucity of cinder and spatter cones. Some of the best photographs of Martian and Hawaiian volcanic features are presented. Descriptive legends are provided for each picture. An overview of the geological processes and structures depicted is included. A.R.H.

**N80-27866\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HIGH RESOLUTION INFRARED SPECTROSCOPY TECHNIQUES FOR UPPER ATMOSPHERIC MEASUREMENTS**

D. G. MURCRAY, ed. (Denver, Univ.) and J. M. ALVAREZ, ed. May 1980 109 p refs Workshop held in Silverthorne Colo., 31 Jul. - 2 Aug. 1979  
(NASA-CP-2134; L-13780) Avail: NTIS HC A06/MF A01 CSCL 04A

ATMOSPHERIC COMPOSITION, CONFERENCES, HIGH RESOLUTION, INFRARED SPECTROSCOPY, UPPER ATMOSPHERE

**N80-28965\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Space Sciences Lab., Science and Engineering.

**NASA/MSFC FY-80 ATMOSPHERIC PROCESSES RESEARCH REVIEW**

R. E. TURNER, comp. Jun. 1980 167 p refs Review held at Huntsville, Ala., 3-5 Jun. 1980

(NASA-CP-2145) Avail: NTIS HC A08/MF A01 CSCL 04A

ATMOSPHERIC ELECTRICITY, CONFERENCES, NASA PROGRAMS, OPTICAL RADAR, STORMS (METEOROLOGY), UPPER ATMOSPHERE

**N80-33998\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**REPORT OF THE NASA WORKING GROUP ON TROPOSPHERIC SPECTROMETER**

C. N. HARWARD and J. M. HOELL, JR. Oct. 1980 14 p refs Presented at Heterodyne Systems and Technol. Conf., Williamsburg, Va., 25-27 Mar. 1980

(NASA-TP-1726; L-13877) Avail: NTIS HC A02/MF A01

CSCL 04A

ATMOSPHERIC ATTENUATION, DIODES, HETERODYNING, INFRARED TRACKING, LASER SPECTROSCOPY, SPECTRORADIOMETERS, TUNING

**N81-23742\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**REPORT OF THE NASA WORKING GROUP ON TROPOSPHERIC PROGRAM PLANNING Final Report**

J. H. SEINFELD, F. ALLARIO, W. R. BANDEEN, W. L. CHAMEIDES, D. D. DAVIS, E. D. HINKLEY, and R. W. STEWART Apr. 1981 162 p refs

(NASA-RP-1062; L-13855) Avail: NTIS HC A08/MF A01

CSCL 04A

Increased understanding of the chemical phenomena occurring in the troposphere was the research goal. Emphasis was placed on tropospheric impact on environmental quality, including public health, agriculture, climate, and weather. S.F.

**N82-10624\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**OZONE TREND DETECTABILITY**

J. W. CAMPBELL, ed. Jul. 1981 108 p refs Proc. of Symp. held at Boulder, Colo., 28-29 Jul. 1977

(NASA-CP-2189; L-14654) Avail: NTIS HC A06/MF A01

CSCL 04A

CLIMATOLOGY, CONFERENCES, ERROR ANALYSIS, ERROR FUNCTIONS, OZONOSPHERE, PERIODIC VARIATIONS, TRENDS

**N82-12687\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAGE MEASUREMENTS OF THE STRATOSPHERIC AEROSOL DISPERSION AND LOADING FROM THE SOUFRIERE VOLCANO**

M. P. MCCORMICK, G. S. KENT (Institute for Atmospheric Optics and Remote Sensing Hampton, Va.), G. K. YUE (Institute for Atmospheric Optics and Remote Sensing Hampton, Va.), and D. M. CUNNOLD (Georgia Inst. of Techn., Atlanta) Nov. 1981 23 p refs

(NASA-TP-1922; L-14611) Avail: NTIS HC A02/MF A01

CSCL 04A

AEROSOLS, CARIBBEAN SEA, REMOTE SENSING, SAGE SATELLITE, SHOCK WAVES, STRATOSPHERE, VIRGIN ISLANDS, VOLCANOES

**N82-13592\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL, VOLUME 1: OCTOBER TO APRIL 1979**

M. P. MCCORMICK Dec. 1981 78 p refs

(NASA-RP-1081) Avail: NTIS HC A05/MF A01 CSCL 04A

Weekly averages of Antarctic and Arctic stratospheric aerosol data as well as corresponding temperature profiles for the time and place of each stratospheric aerosol measurement (SAM) II measurement during the first 6 months of satellite flight are presented. From the aerosol extinction profile data, contours of aerosol extinction as a function of altitude and longitude or time are plotted. Aerosol optical depths are calculated for each week. Polar stratospheric clouds at altitudes of about 22 km were observed during the Arctic winter at various times and locations. A representative sample of the first 6 months of data to be used in atmospheric and climatic studies is outlined. E.A.K.

**N82-19734\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL, VOLUME 2. APRIL 1979 TO OCTOBER 1979**

M. P. MCCORMICK, H. M. STEELE (Systems and Applied Sciences Corp., Hampton, Va.), and P. HAMILL (Systems and Applied Sciences Corp., Hampton, Va.) Mar. 1982 78 p refs

(NASA-RP-1088-VOL-2; L-15120) Avail: NTIS HC A05/MF A01

CSCL 04A

The Stratospheric Aerosol Measurement (SAM) II sensor is aboard the Earth orbiting Nimbus 7 spacecraft providing extinction measurements of the Antarctic and Arctic stratospheric aerosol with a vertical resolution of 1 km. Representative examples and weekly averages of aerosol data and corresponding temperature profiles for the time and place of each SAM II measurement (April 29, 1979, to October 27, 1979) is presented. Contours of aerosol extinction as a function of altitude and longitude or time were plotted and weekly aerosol optical depths were calculated. Seasonal variations and variations in space (altitude and longitude) for both polar regions are easily seen. Typical values of aerosol extinction at the SAM II wavelength of 1.0 micron for the time period were 1 to 3 x 10 to the -4th power km -1 in the main stratospheric aerosol layer. Optical depths for the stratosphere were about 0.002. Polar stratospheric clouds at altitudes between the tropopause and 20 km were observed during the Antarctic winter at various times and locations. A ready-to-use format containing a representative sample of the second 6 months of data to be used in atmospheric and climatic studies is presented. M.D.K.

**N82-29796\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**APPLYING MODELING RESULTS IN DESIGNING A GLOBAL TROPOSPHERIC EXPERIMENT**

Jul. 1982 95 p refs Presented at a Working Group Meeting, Virginia Beach, Va., 15-16 Jul. 1981

(NASA-CP-2235; L-15383; NAS 1.55:2235) Avail: NTIS HC

A05/MF A01 CSCL 04A

AIR QUALITY, ATMOSPHERIC COMPOSITION, EARTH OBSERVATIONS (FROM SPACE), TROPOSPHERE

**N82-32915\*#** Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology and Physical Oceanography.  
**REPORT OF WORKSHOP ON MOUNT SAINT HELENS: ITS ATMOSPHERIC EFFECTS AND POTENTIAL CLIMATIC IMPACT**

R. E. NEWELL, ed. and A. DEEPAK, ed. (Inst. for Atmospheric Optics and Remote Sensing) 1982 141 p refs Workshop held in Washington, D.C., 20-21 Nov. 1980; sponsored by Inst. for Atmospheric Optics and Remote Sensing Original contains color illustrations

(NAS1-16454)

(NASA-SP-458; NAS 1.26:458; LC-82-8005) Avail: NTIS MF A01; SOD HC \$6.00 CSCL 08K

The atmospheric and potential climatic aspects of a volcanic eruption were discussed. Measurements and techniques used in collecting the data are summarized. S.L.

**N82-33918\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A TUTORIAL SOLUTION TO SCATTERING OF RADIATION IN A THIN ATMOSPHERE BOUNDED BELOW BY A DIFFUSELY REFLECTING, ABSORBING SURFACE**

J. J. BUGLIA Sep. 1982 29 p refs

(NASA-TP-2077; L-15432; NAS 1.60:2077) Avail: NTIS HC

A03/MF A01 CSCL 04A

ALBEDO, ATMOSPHERIC SCATTERING, OPTICAL REFLECTION, RADIATIVE TRANSFER, SURFACE PROPERTIES

**N83-16992\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**OZONE CLIMATOLOGY SERIES. VOLUME 1: ATLAS OF TOTAL OZONE, APRIL 1970 - DECEMBER 1976**

D. F. HEATH, A. J. FLEIG, A. J. MILLER, T. G. ROGERS, R. M. NAGATANI, H. D. BOWMAN, II, V. G. KAVEESHWAR, K. F. KLENK, P. K. BHARTIA, and K. D. LEE Dec. 1982 180 p refs Prepared in cooperation with National Oceanic and Atmospheric Administration, Washington D. C. and Systems and Applied Sciences Corp., Riverdale, MD.

(NASA-RP-1098; NAS 1.61:1098; REPT-82F0128-VOL-1) Avail: NTIS HC A09/MF A01 CSCL 04A

Contours and gridded values are given for seven years of monthly mean total ozone data derived from observations with the Backscattered Ultraviolet instrument on Nimbus-4 for the Northern and Southern Hemispheres. The instrument, algorithm, uncertainties in derived ozone and systematic changes in the bias with respect to the international groundbased ozone network of Dobson instruments, are discussed. Author

**N83-27520\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL. VOLUME 3: OCTOBER 1979 TO APRIL 1980**

M. P. MCCORMICK and D. BRANDL (Systems and Applied Sciences Corp., Hampton, Va.) Jun. 1983 77 p refs

(NASA-RP-1106; L-15624; NAS 1.61:1106) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) II sensor is aboard the Earth-orbiting Nimbus 7 spacecraft providing extinction measurements of the Antarctic and Arctic stratospheric aerosol with a vertical resolution of 1 km. Representative examples and weekly averages of aerosol data and corresponding temperature profiles for the time and place of each SAM II measurement (Oct. 1979 through Apr. 1980) are presented. Contours of aerosol extinction as a function of altitude and longitude or time are plotted and weekly aerosol optical depths are calculated. Seasonal variations and variations in space (altitude and longitude) for both polar regions are easily seen. Typical values of aerosol extinction at the SAM II wavelength of 1.0 microns for this time period are 2 to 4 times .0001/km in the main stratospheric aerosol layer. Optical depths for the stratosphere are about 0.002 to 0.003, up slightly over normal background levels (due to the eruption of Sierra Negra, Nov. 1979). Polar stratospheric clouds at altitudes of about 22 km were observed during the Arctic winter. A

ready-to-use format containing a representative sample of the third 6 months of data to be used in atmospheric and climatic studies is presented. Author

**N83-28796\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL. VOLUME 4: APRIL 1980 TO OCTOBER 1980**

M. P. MCCORMICK and D. BRANDL (Systems and Applied Sciences Corp., Hampton, Va.) Jun. 1983 78 p refs 4 Vol. (NASA-RP-1107; L-15625; NAS 1.61:1107) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) 2 sensor is aboard the Nimbus 7 spacecraft providing extinction measurements of the Antarctic and Arctic stratospheric aerosols with a vertical resolution of 1 km. Representative examples and weekly averages of these aerosol data and corresponding temperature profiles are presented. Contours of aerosols extinction as a function of altitude and longitude or time are plotted and weekly aerosol optical depths are calculated. Stratospheric optical depths are 0.002 to 0.003 for the Antarctic and 0.002 to 0.003 at the beginning to 0.005 to 0.006 at the end of the time period for the Arctic. Polar stratospheric clouds at altitudes between the tropopause and 20 km were observed during the Antarctic winter. A ready-to-use format containing a representative sample of the fourth 6 months of data to be used in atmospheric and climatic studies is reported. Author

**N84-10675\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE NASA GEODYNAMICS PROGRAM: AN OVERVIEW**

Jan. 1983 132 p refs

(NASA-TP-2147; NAS 1.60:2147) Avail: NTIS HC A07/MF A01 CSCL 08G

EARTH ROTATION, GEODYNAMICS, NASA PROGRAMS, TECTONICS

**N84-13706\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PROCEEDINGS OF A WORKSHOP ON ASSESSMENT OF TECHNIQUES FOR MEASURING TROPOSPHERIC N SUB X O SUB Y**

Dec. 1983 63 p refs Workshop held in Palo Alto, Calif., 16-20 Aug. 1982

(NASA-CP-2292; L-15720; NAS 1.55:2292) Avail: NTIS HC A04/MF A01 CSCL 04A

ATMOSPHERIC CHEMISTRY, NITRIC OXIDE, TROPOSPHERE

**N84-14606\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SPACE SHUTTLE EXHAUST CLOUD PROPERTIES**

B. J. ANDERSON and V. W. KELLER Dec. 1983 117 p refs (NASA-TP-2258; NAS 1.60:2258) Avail: NTIS HC A06/MF A01 CSCL 04A

CLOUDS, ROCKET EXHAUST, SPACE SHUTTLES

**N84-32952\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PROCEEDINGS OF A WORKSHOP ON POLAR STRATOSPHERIC CLOUDS: THEIR ROLE IN ATMOSPHERIC PROCESSES**

P. HAMILL, ed. (San Jose State Univ., Calif.) and L. R. MCMASTER, ed. Sep. 1984 80 p refs Proc. held in Virginia Beach, Va., 20-22 Jun. 1983

(NASA-CP-2318; L-15809; NAS 1.55:2318) Avail: NTIS HC A05/MF A01 CSCL 04A

ATMOSPHERIC CHEMISTRY, ATMOSPHERIC RADIATION, CONFERENCES, POLAR METEOROLOGY, STRATOSPHERE

**N85-14336\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ASSESSMENT OF TECHNIQUES FOR MEASURING TROPOSPHERIC H SUB X O SUB Y**

J. M. HOELL, ed. Washington Dec. 1984 139 p refs Workshop held in Palo Alto, Calif., 16-20 Aug. 1982 (NASA-CP-2332; L-15847; NAS 1.55:2332) Avail: NTIS HC A07/MF A01 CSCL 04A

ATMOSPHERIC CHEMISTRY, CONFERENCES, MEASURING INSTRUMENTS, RADIOCHEMISTRY, TROPOSPHERE

**N85-19550\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AIRBORNE LIDAR MEASUREMENTS OF EL CHICHON STRATOSPHERIC AEROSOLS, OCTOBER 1982 TO NOVEMBER 1982**

M. P. MCCORMICK and M. T. OSBORN (Systems and Applied Sciences Corp.) Feb. 1985 120 p refs (NASA-RP-1136; L-15904; NAS 1.61:1136) Avail: NTIS HC A06/MF A01 CSCL 04A

A coordinated flight mission to determine the spatial distribution and aerosol characteristics of the El Chichon produced stratospheric aerosol was flown in October to November 1982. The mission covered 46 deg N to 46 deg S and included rendezvous between balloon-, airplane-, and satellite-borne sensors. The lidar data from the flight mission are presented. Representative profiles of lidar backscatter ratio, plots of the integrated backscattering function versus latitude, and contours of backscatter mixing ratio versus altitude and latitude are given. In addition, tables containing numerical values of the backscatter ratio and backscattering functions versus altitude are supplied for each profile. The bulk of the material produced by the El Chichon eruptions of late March 10 to early April 1982 resided between latitudes from 5 to 7 deg S to 35 to 37 deg N and was concentrated above 21 km in a layer that peaked at 23 to 25 km. In this latitude region, peak scattering ratios at a wavelength of 0.6943 micron were approximately 24. The results of this mission are presented in a ready-to-use format for atmospheric and climatic studies. Author

**N85-25970\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL, VOLUME 5 Report, Oct. 1980 - Apr. 1981**

M. P. MCCORMICK and D. BRANDL (Systems and Applied Sciences Corp., Hampton, Va.) May 1985 78 p refs (NASA-RP-1140; L-15947; NAS 1.61:1140) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) 2 sensor is aboard the Earth-orbiting Nimbus 7 spacecraft providing extinction measurements of the Antarctic and Arctic stratospheric aerosol with a vertical resolution of 1 km. Representative examples and weekly averages of aerosol data and corresponding temperature profiles for the time and place of each SAM 2 measurement (Oct. 1980 through Apr. 1981) are presented. Contours of aerosol extinction as a function of altitude and longitude or time are plotted and weekly aerosol optical depths are calculated. Seasonal variations and variations in space (altitude and longitude) for both polar regions are easily seen. Stratospheric optical depths are 0.002 to 0.003 for the Antarctic region and 0.005 to 0.006 at the beginning to 0.002 to 0.003 at the end of the time period for the Arctic region. The Northern Hemisphere values are quite large due mainly to the eruption of Mount St. Helens (46.2 deg N, 122.2 deg W) in May 1980. Polar stratospheric clouds at altitudes of about 20 km were observed during the Arctic winter. A ready-to-use format containing a representative sample of the fifth 6 months of data to be used in atmospheric and climatic studies is presented. B.W.

**N85-27422\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAM II MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL. VOLUME 6: APRIL TO OCTOBER 1981**

M. P. MCCORMICK and D. BRANDL (Systems and Applied Sciences Corp., Hampton, Va.) May 1985 78 p refs 6 Vol. (NASA-RP-1141; L-15948; NAS 1.61:1141) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) II sensor is aboard the Earth-orbiting Nimbus 7 spacecraft providing extinction measurements of the Antarctic and Arctic stratospheric aerosols with a vertical resolution of 1 km. Representative examples and weekly averages of these aerosol data and corresponding temperature profiles (Apr. 1981 to Oct. 1981) are presented. Contours of aerosol extinction as a function of altitude and longitude or time are plotted and weekly aerosol optical depths are calculated. Stratospheric optical depths are 0.002 to 0.003 for the Antarctic region and 0.006 to 0.007 at the beginning to 0.003 to 0.004 at the end of the time period for the Arctic region. Polar stratospheric clouds at altitudes between the tropopause and 20 km were observed during the Antarctic winter. A ready-to-use format containing a representative sample of the sixth 6 months of data to be used in atmospheric and climatic studies is reported. Author

**N86-11700\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAGE AEROSOL MEASUREMENTS. VOLUME 1: FEBRUARY 21, 1979 TO DECEMBER 31, 1979**

M. P. MCCORMICK Oct. 1985 371 p refs (NASA-RP-1144; L-15962; NAS 1.61:1144) Avail: NTIS HC A16/MF A01 CSCL 04A

The Stratospheric Aerosol and Gas Experiment (SAGE) satellite system, launched on February 18, 1979, provides profiles of aerosol extinction, ozone concentration, and nitrogen dioxide concentration between about 80 N and 80 S. Zonal averages, separated into sunrise and sunset events, and seasonal averages of the aerosol extinction at 1.00 microns and 0.45 microns ratios of the aerosol extinction to the molecular extinction at 1.00 microns, and ratios of the aerosol extinction at 0.45 microns to the aerosol extinction at 1.00 microns are given. The averages for 1979 are shown in tables and in profile and contour plots (as a function of altitude and latitude). In addition, temperature data provided by the National Oceanic and Atmospheric Administration (NOAA) for the time and location of each SAGE measurement are averaged and shown in a similar format. Typical values of the peak aerosol extinction were 0.0001 to 0.0002 km at 1.00 microns depth values for the 1.00 microns channel varied between 0.001 and 0.002 over all latitudes. Author

**N86-12852\*#** National Aeronautics and Space Administration, Washington, D.C.

**GEOPOTENTIAL RESEARCH MISSION (GRM)**

Oct. 1985 141 p refs Conf. held in College Park, Md., 29-31 Oct. 1984 (NASA-CP-2390; NAS 1.55:2390) Avail: NTIS HC A07/MF A01 CSCL 08E

ALTIMETERS, CONFERENCES, EARTH CRUST, GEODESY, GEODYNAMICS, GEOPOTENTIAL, GEOPOTENTIAL RESEARCH MISSION, GRAVITATIONAL FIELDS, MAGNETIC FIELDS, TECTONICS

**N86-13850\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AIRBORNE LIDAR MEASUREMENTS OF EL CHICHON STRATOSPHERIC AEROSOLS**

M. P. MCCORMICK and M. T. OSBORN (SASC Technologies, Inc., Hampton, Va.) Oct. 1985 89 p refs (NASA-RP-1148; L-16007; NAS 1.61:1148) Avail: NTIS HC A05/MF A01 CSCL 04A

A NASA Electra airplane, outfitted with a lidar system, was flown in January to February 1983 between the latitudes of 27 deg N and 76 deg N. One of the primary purposes of this mission



was to determine the spatial distribution and aerosol characteristics of the El Chichon-produced stratospheric material. This report presents the lidar data from that flight mission. Representative profiles of lidar backscatter ratio, plots of the integrated backscattering function versus latitude, and contours of backscatter mixing ratio versus altitude and latitude are given. In addition, tables containing numerical values of the backscatter ratio and backscattering function versus altitude are supplied for each profile. The largest amount of material produced by the El Chichon eruptions of late March to early April 1982, which was measured by this flight, resided between 35 deg N and 52 deg N. Peak backscatter ratios at a wavelength of 0.6943 micron decreased from 8 to 10 at the lower latitudes to 3 at the higher latitudes. Backscatter ratio profiles taken while crossing the polar vortex show that the high-altitude material from El Chichon arrived at the north polar region sometime after the winter polar vortex was established. This report presents the results of this mission in a ready-to-use format for atmospheric and climatic studies. Author

**N86-22022\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**COMPARATIVE ACCURACY OF THE ALBEDO, TRANSMISSION AND ABSORPTION FOR SELECTED RADIATIVE TRANSFER APPROXIMATIONS**

M. D. KING and HARSHVARDHAN Jan. 1986 47 p refs (NAG5-309)  
(NASA-RP-1160; REPT-86B0034; NAS 1.61:1160) Avail: NTIS HC A03/MF A01 CSCL 04A

Illustrations of both the relative and absolute accuracy of eight different radiative transfer approximations as a function of optical thickness, solar zenith angle and single scattering albedo are given. Computational results for the plane albedo, total transmission and fractional absorption were obtained for plane-parallel atmospheres composed of cloud particles. These computations, which were obtained using the doubling method, are compared with comparable results obtained using selected radiative transfer approximations. Comparisons were made between asymptotic theory for thick layers and the following widely used two stream approximations: Coakley-Chylek's models 1 and 2, Meador-Weaver, Eddington, delta-Eddington, PIFM and delta-discrete ordinates. Author

**N86-23088\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SAGE AEROSOL MEASUREMENTS. VOLUME 2: 1 JANUARY - 31 DECEMBER 1980**

M. P. MCCORMICK Jan. 1986 310 p refs 2 Vol.  
(NASA-RP-1149; L-16028; NAS 1.61:1149) Avail: NTIS HC A14/MF A01 CSCL 04A

The stratospheric Aerosol and Gas Experiment (SAGE) satellite system, launched on February 18, 1979, provides profiles of aerosol extinction at wavelengths of 1.00 and 0.45 micron, ozone concentration, and nitrogen dioxide concentration. Data taken during sunset events in the form of zonal averages and seasonal averages of the aerosol extinction at 1.00 and 0.45 micron, ratios of the aerosol extinction to the molecular extinction at 1.00 micron, and ratios of the aerosol extinction at 0.45 micron to the aerosol extinction at 1.00 micron are presented. The averages for 1980 are shown in tables and in profile and contour plots (as a function of altitude and latitude). In addition, temperature data provided by the National Oceanic and Atmospheric Administration (NOAA) for the time and location of each SAGE measurement are averaged and shown in a similar format. Author

**N86-25900\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**COMPENDIUM OF METEOROLOGY SCIENTIFIC ISSUES OF 1950 STILL OUTSTANDING**  
W. W. VAUGHAN Apr. 1986 59 p refs  
(NASA-RP-1167; NAS 1.61:1167) Avail: NTIS HC A04/MF A01 CSCL 04A

The Compendium of Meteorology was published in 1951 by the American Meteorological Society. A review was made of the Compendium of Meteorology to identify the studies and future

needs which the authors expressed in their papers. The needs as seen by the authors are organized into sections and papers following the format of the Compendium of Meteorology. In some cases the needs they identified are as valid today as they were in 1951. In other cases one will easily be able to identify examples where significant progress has been made. It is left to the individual scientists and scientific program managers to assess whether significant progress has been made over the past thirty-five years on these outstanding scientific issues. Author

**N86-25911\*#** National Aeronautics and Space Administration, Washington, D.C.

**PRESENT STATE OF KNOWLEDGE OF THE UPPER ATMOSPHERE: AN ASSESSMENT REPORT; PROCESSES THAT CONTROL OZONE AND OTHER CLIMATICALLY IMPORTANT TRACE GASES**

R. T. WATSON, M. A. GELLER (National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.), R. S. STOLARSKI, and R. F. HAMPSON May 1986 149 p refs  
Original doc. contains color illustrations  
(NASA-RP-1162; NAS 1.61:1162) Avail: NTIS HC A07/MF A01 CSCL 04A

The state of knowledge of the upper atmosphere was assessed as of January 1986. The physical, chemical, and radiative processes which control the spatial and temporal distribution of ozone in the atmosphere; the predicted magnitude of ozone perturbations and climate changes for a variety of trace gas scenarios; and the ozone and temperature data used to detect the presence or absence of a long term trend were discussed. This assessment report was written by a small group of NASA scientists, was peer reviewed, and is based primarily on the comprehensive international assessment document entitled Atmospheric Ozone 1985: Assessment of Our Understanding of the Processes Controlling Its Present Distribution and Change, to be published as the World Meteorological Organization Global Ozone Research and Monitoring Project Report No. 16. Author

**N86-27835\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AIRBORNE LIDAR MEASUREMENTS OF EL CHICHON STRATOSPHERIC AEROSOLS**

M. P. MCCORMICK and M. T. OSBORN (SASC Technologies, Inc., Hampton, Va.) Jul. 1982 49 p Supersedes NASA-RP-1136  
NASA-RP-1148  
(NASA-RP-1166; L-16107; NAS 1.61:1166) Avail: NTIS HC A03/MF A01 CSCL 04A

A NASA Electra airplane outfitted with a lidar system was flown in July 1982 between the latitudes of 42 deg. N and 12 deg. N. The primary purpose of this mission was to determine the spatial distribution and aerosol characteristics of the El Chichon-produced stratospheric material. This report presents the lidar data from that flight mission. Representative profiles of lidar backscatter ratio, plots of the integrated backscattering function versus latitude, and contours of backscatter mixing ratio versus altitude and latitude are given. In addition, tables containing numerical values of the backscatter ratio and backscattering functions versus altitude are supplied for each profile. The largest amount of material produced by the El Chichon eruptions of late March-early April 1982 which was measured by this flight resided south of 30 deg. N and was concentrated above 21 km in a layer that peaked at 24 to 27 km. In this latitude region, peak backscatter ratios at a wavelength of 0.6943 microns were approximately 50, and peak optical depths were calculated to be 0.2. This report presents the results of this mission in a ready-to-use format for atmospheric and climatic studies. Author



**N86-27839\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTRODUCTION TO THE THEORY OF ATMOSPHERIC RADIATIVE TRANSFER**

J. J. BUGLIA Jul. 1986 171 p  
(NASA-RP-1156; L16068; NAS 1.61:1156) Avail: NTIS HC A08/MF A01 CSCL 04A

The fundamental physical and mathematical principles governing the transmission of radiation through the atmosphere are presented, with emphasis on the scattering of visible and near-IR radiation. The classical two-stream, thin-atmosphere, and Eddington approximations, along with some of their offspring, are developed in detail, along with the discrete ordinates method of Chandrasekhar. The adding and doubling methods are discussed from basic principles, and references for further reading are suggested. Author

**N86-28562\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL, VOLUME 2 Report, Oct. 1981 - Apr. 1982**

M. P. MCCORMICK and D. BRANDL (SASC Technologies, Inc., Hampton, Va.) Aug. 1986 78 p  
(NASA-RP-1164; L-16105; NAS 1.61:1164) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) 2 sensor aboard Nimbus 7 is providing extinction measurements of Antarctic and Arctic stratospheric aerosols with a vertical resolution of 1 km. Representative examples and weekly averages including corresponding temperature profiles provided by NOAA for the time and place of each SAM 2 measurement (Oct. 1981 - Apr. 1982) are presented. Contours of aerosol extinction as a function of altitude and longitude or time are plotted, and aerosol optical depths are calculated for each week. Typical values of aerosol extinction at 1.0 micron in the main lower stratospheric aerosol layer for this time period are 2 to 4 times 10 to the -4 power/km. for the Antarctic region and 0.5 to 1 times 10 to the -3 power/km. for the Arctic region. Stratospheric optical depths are about 0.001 to 0.004 for the Antarctic region and 0.003 to 0.004 at the beginning to about 0.006 at the end of the time period for the Arctic region. Polar stratospheric clouds (PSC's) were observed during the Arctic winter, as expected. This report provides, in a ready-to-use format, a representative sample of the seventh semester of data to be used in atmospheric and climatic studies. Author

**N86-29425\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**EL NINO AND OUTGOING LONGWAVE RADIATION: AN ATLAS OF NIMBUS-7 EARTH RADIATION BUDGET OBSERVATIONS**

H. L. KYLE (Research and Data Systems, Inc., Lanham, Md.), P. E. ARDANUY, and R. R. HUCEK Apr. 1986 184 p  
(NAS5-27728)

(NASA-RP-1163; NAS 1.61:1163; REPT-85B0565) Avail: NTIS HC A05/MF A01 CSCL 04A

Five years of broadband Earth Radiation Budget (ERB) measurements taken by the Nimbus-7 ERB experiment have been archived. This five year period included the 1982 to 1983 El Nino/Southern Oscillation event, which reached its peak in January 1983 (near the beginning of the fifth data year). An outgoing longwave radiation subset of the data, for the period June 1980 to October 1983, was processed to enhance spatial resolution. This atlas contains the analyses of the resultant fields. In addition, a set of anomaly maps, based on a definition of pre-El Nino climatology, is included. Together, these two sets of maps provide the first broadband glimpse of the terrestrial outgoing longwave radiation response to the El Nino event. Author

**N86-29428\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL, VOLUME 8 Report, Apr. - Oct. 1982**

M. P. MCCORMICK and D. BRANDL (Systems and Applied Sciences Corp., Hampton, Va.) Aug. 1986 80 p  
(NASA-RP-1165; L-16106; NAS 1.61:1165) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) 2 sensor aboard Nimbus 7 is providing extinction measurements of Antarctic and Arctic stratospheric aerosols with a vertical resolution of 1 km. Representative examples and weekly averages including corresponding temperature profiles provided by NOAA for the time and place of each SAM 2 measurement (Apr. 1982 - Oct. 1982) are presented. Contours of aerosol extinction as a function of altitude and longitude or time are plotted, and aerosol optical depths are calculated for each week. Typical values of aerosol extinction at 1.0 microns in the main stratospheric aerosol layer are approximately 4 to 6 times .0001/km at the beginning to 1 to 2 times .001/km at the end of the time period for the Antarctic region and approximately 1 to 3 times .001/km for the Arctic region throughout the time period. Stratospheric optical depths are about 0.002 to 0.009 for the Antarctic region and about 0.007 at the beginning to 0.024 at the end of the time period for the Arctic region. Polar stratospheric clouds were observed during the Antarctic winter, as expected. This report provides, in a ready-to-use format, a representative sample of the eighth 6 months of data to be used in atmospheric and climatic studies.

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### METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

**N77-10755\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE 1976 STANDARD ATMOSPHERE ABOVE 86-KM ALTITUDE: RECOMMENDATIONS OF TASK GROUP 2 TO COESA**

R. A. MINZNER, ed. Washington 1976 77 p refs  
(NASA-SP-398) Avail: NTIS HC \$4.75 CSCL 04A

The development of an atmospheric model for altitudes above 86 km. is described. Temperature and composition profiles are given particular attention. D.M.L.

**N77-19709\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**SATELLITE-DERIVED GLOBAL OCEANIC RAINFALL ATLAS (1973 AND 1974)**

M. S. V. RAO, W. V. ABBOTT, III, and J. S. THEON 1976 336 p refs Original contains color illustrations  
(NASA-SP-410; LC-76-600054) Avail: SOD HC as C/N NAS1.21:410 CSCL 04B

Based on the relationship between satellite-borne electrically scanning microwave radiometer brightness temperatures and rain rates over oceans, quantitative maps of rainfall were obtained from Nimbus-5 microwave data. Weekly, monthly, seasonally, and annually averaged maps were generated from December 1972 through February 1975. From these maps, the patterns of rainfall in the Pacific, Atlantic, and Indian Oceans were analyzed. It was shown that the data permit the monitoring of features such as the movement of the Intertropical Convergence Zone and the advance of the Indian Monsoon. An interesting rainfall pattern in the Pacific, associated with the El Nino phenomenon, was interpreted in terms of a local variation of the Hadley cell circulation. The variations in oceanic rainfall and in latent heat release (which was also computed) should provide useful inputs to numerical models and to studies of planetary energy and water budgets. Author

## 47 METEOROLOGY AND CLIMATOLOGY

**N77-30705\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**FRONTS AND FRONTGENESIS AS REVEALED BY HIGH TIME RESOLUTION DATA**

A. E. FRANK (Oregon State Univ.) and D. A. BARBER (Oregon State Univ.) Aug. 1977 135 p refs  
(NASA-RP-1005; M-226) Avail: NTIS HC A07/MF A01 CSCL 04B

Upper air sounding are used to examine a cold front of average intensity. Vertical cross sections of potential temperature and wind, and horizontal analyses were compared and adjusted for consistency. These analyses were then used to study the evolution of the front, found to consist of a complex system of fronts occurring at all levels of the troposphere. Low level fronts were strongest at the surface and rapidly weakened with height. Fronts in the middle troposphere were much more intense. The warm air ahead of the fronts was nearly barotropic, while the cold air behind was baroclinic through deep layers. A deep mixed layer was observed to grow in this cold air. Author

**N77-32688\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**THE NASA AMES RESEARCH CENTER ONE- AND TWO-DIMENSIONAL STRATOSPHERIC MODELS. PART 1: THE ONE-DIMENSIONAL MODEL**

R. P. TURCO (R and D Assoc., Marina Del Rey, Calif.) and R. C. WHITTEN Sep. 1977 32 p refs  
(NASA-TP-1002; A-6983) Avail: NTIS HC A03/MF A01 CSCL 04B

ATMOSPHERIC CHEMISTRY, ATMOSPHERIC MODELS, DIFFERENTIAL EQUATIONS, STRATOSPHERE

**N77-32689\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**THE NASA AMES RESEARCH CENTER ONE- AND TWO-DIMENSIONAL STRATOSPHERIC MODELS. PART 2: THE TWO-DIMENSIONAL MODEL**

R. C. WHITTEN, W. J. BORUCKI, V. R. WATSON, T. SHIMAZAKI, H. T. WOODWARD, C. A. RIEGEL (San Jose State Univ., Calif.), L. A. CAPONE (San Jose State Univ., Calif.), and T. BECKER (Informatics, Inc., Palo Alto, Calif.) Sep. 1977 23 p refs  
(NASA-TP-1003; A-6982) Avail: NTIS HC A02/MF A01 CSCL 04B

ATMOSPHERIC CHEMISTRY, ATMOSPHERIC MODELS, DIFFERENTIAL EQUATIONS, STRATOSPHERE, TRACE ELEMENTS

**N78-11642\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**DEVELOPMENT OF A PROCEDURE TO MODEL HIGH-RESOLUTION WIND PROFILES FROM SMOOTHED OR LOW-FREQUENCY DATA**

D. W. CAMP Washington Nov. 1977 92 p refs  
(NASA-TP-1071; M-239) Avail: NTIS HC A05/MF A01 CSCL 04B

HIGH RESOLUTION, MODELS, RAWINSONDES, WIND PROFILES

**N78-15641\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THE MECHANICS OF ATMOSPHERIC SYSTEMS DERIVED THROUGH VERTICAL AND HORIZONTAL ANALYSIS OF PARAMETRIC DATA**

R. E. TURNER Nov. 1977 187 p refs Original contains color illustrations  
(NASA-TP-1072; M-237) Avail: NTIS HC E06/MF A01 CSCL 04B

ATMOSPHERICS, INDEPENDENT VARIABLES

**N78-18630\*#** National Meteorological Center, Washington, D.C.  
**STRATOSPHERIC WARMINGS: SYNOPTIC, DYNAMIC AND GENERAL-CIRCULATION ASPECTS**

R. M. MCINTURFF, ed. Jan. 1978 173 p refs Sponsored by NASA  
(NASA-RP-1017) Avail: NTIS HC A08/MF A01 CSCL 04B

Synoptic descriptions consist largely of case studies, which involve a distinction between major and minor warmings. Results of energetics studies show the importance of tropospheric-stratospheric interaction, and the significance of the pressure-work term near the tropopause. Theoretical studies have suggested the role of wave-zonal flow interaction as well as nonlinear interaction between eddies, chemical and photochemical reactions, boundary forcing, and other factors. Numerical models have been based on such considerations, and these are discussed under various categories. Some indication is given as to why some of the models have been more successful than others in simulating warmings. The question of ozone and its role in warmings is briefly discussed. Finally, a broad view is taken of stratospheric warmings in relation to man's activities. Author

**N78-19711\*#** Tennessee Univ. Space Inst., Tullahoma.  
**PROCEEDINGS OF THE FIRST ANNUAL METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS WORKSHOP**

D. W. CAMP, ed. and W. FROST, ed. Mar. 1977 335 p refs Workshop held at Tullahoma, Tenn., 8-10 Mar. 1977; sponsored by NASA, NOAA, and FAA  
(NAS8-29584)

(NASA-CP-2028; FAA-RD-77-173) Avail: NTIS HC A15/MF A01 CSCL 04B

AERONAUTICS, AIRCRAFT DESIGN, MAN ENVIRONMENT INTERACTIONS, REPORTS, SERVICES, SIMULATION

**N78-23679\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATION STUDIES OF WIDE AND MEDIUM FIELD OF VIEW EARTH RADIATION DATA ANALYSIS**

R. N. GREEN May 1978 46 p refs  
(NASA-TP-1182; L-12003) Avail: NTIS HC A03/MF A01 CSCL 04B

COMPUTERIZED SIMULATION, DATA PROCESSING, RADIATION DISTRIBUTION, TERRESTRIAL RADIATION

**N78-27706\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

**AN EVALUATION OF IN SITU OZONE SENSOR PERFORMANCE DURING A COLD FRONTAL PASSAGE**

C. L. PARSONS Jul. 1978 34 p refs  
(NASA-TP-1239) Avail: NTIS HC A03/MF A01 CSCL 04B  
ATMOSPHERIC COMPOSITION, CLIMATOLOGY, OZONE

**N78-28748\*#** National Weather Service, Camp Springs, Md.  
**SYNOPTIC ANALYSES, 5-, 2-, AND 0.4-MILLIBAR SURFACES FOR JULY 1974 THROUGH JUNE 1976**

Jun. 1978 330 p refs  
(NASA ORDER P-55946-G)  
(NASA-RP-1023) Avail: NTIS HC A15/MF A01 CSCL 04B

Meteorological rocketsonde and satellite radiance data were employed for analyses of a continuing series of high altitude constant pressure charts. The methods of processing, the various types of data utilized and the analysis procedure are described. Broad-scale analyses of temperature and geopotential height for the Northern Hemisphere 5, 2, and 0.4 mb surfaces are presented for each week of the period July 1974 through June 1976. Brief discussions of the variations of the temperature and height fields throughout the two year period are also given. G.Y.

**N78-30774\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**AN ASSESSMENT OF THE EFFECT OF SUPERSONIC AIRCRAFT OPERATIONS ON THE STRATOSPHERIC OZONE CONTENT**

I. G. POPPOFF, R. C. WHITTEN, R. P. TURCO (R and D Associates, Marina del Rey, Calif.), and L. A. CAPONE (San Jose State Univ., Calif.) Aug. 1978 60 p refs  
(NASA-RP-1026; A-7399) Avail: NTIS HC A04/MF A01 CSCL 13B

An assessment of the potential effect on stratospheric ozone of an advanced supersonic transport operations is presented. This assessment, which was undertaken because of NASA's desire for an up-to-date evaluation to guide programs for the development of supersonic technology and improved aircraft engine designs, uses the most recent chemical reaction rate data. From the results of the present assessment it would appear that realistic fleet sizes should not cause concern with regard to the depletion of the total ozone overburden. For example, the NO<sub>x</sub> emission of one type designed to cruise at 20 km altitude will cause the ozone overburden to increase by 0.03% to 0.12%, depending upon which vertical transport is used. These ozone changes can be compared with the predictions of a 1.74% ozone decrease (for 100 Large SST's flying at 20 km) made in 1974 by the FAA's Climatic Impact Assessment Program. Author

**N78-32641\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THE EFFECTS OF CURVATURE AND VISCOSITY ON BAROCLINIC INSTABILITY: A TWO-LAYER MODEL**

W. W. FOWLIS and S. ARIAS Sep. 1978 31 p refs  
(NASA-TP-1328; M-264) Avail: NTIS HC A03/MF A01 CSCL 04B

BAROCLINITY, CURVATURE, FLUID FLOW, VISCOUS FLOW

**N79-13644\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PARAMETER ESTIMATION APPLIED TO NIMBUS 6 WIDE-ANGLE LONGWAVE RADIATION MEASUREMENTS**

R. N. GREEN and G. L. SMITH Dec. 1978 40 p refs  
(NASA-TP-1307; L-12233) Avail: NTIS HC A03/MF A01 CSCL 04B

LONG WAVE RADIATION, NIMBUS 6 SATELLITE, PARAMETERIZATION, RADIATION MEASUREMENT, SPHERICAL HARMONICS

**N79-14678\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SUMMARY OF ATMOSPHERIC WIND DESIGN CRITERIA FOR WIND ENERGY CONVERSION SYSTEM DEVELOPMENT**

W. FROST (Tennessee Univ. Space Inst., Tullahoma) and R. E. TURNER Jan. 1979 54 p  
(NAS8-32118)  
(NASA-TP-1389; M-280) Avail: NTIS HC A04/MF A01 CSCL 04B

ENERGY CONVERSION, ENERGY POLICY, WINDPOWER UTILIZATION

**N79-14679\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**ENGINEERING HANDBOOK ON THE ATMOSPHERIC ENVIRONMENTAL GUIDELINES FOR USE IN WIND TURBINE GENERATOR DEVELOPMENT**

W. FROST (Tennessee Univ. Space Inst., Tullahoma), B. H. LONG (Tennessee Univ. Space Inst., Tullahoma), and R. E. TURNER Dec. 1978 379 p refs  
(NASA-TP-1359; M-267) Avail: NTIS HC A17/MF A01 CSCL 04B

HANDBOOKS, MECHANICAL ENGINEERING, VALUE ENGINEERING, WIND (METEOROLOGY), WINDPOWERED GENERATORS

**N79-14680\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SEQUENTIAL HIGH-RESOLUTION WIND PROFILE MEASUREMENTS**

D. L. JOHNSON and W. W. VAUGHAN Dec. 1978 411 p refs  
(NASA-TP-1354) Avail: NTIS HC A18/MF A01 CSCL 04B  
HIGH RESOLUTION, SEQUENTIAL ANALYSIS, WIND MEASUREMENT, WIND PROFILES

**N79-16493\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**A SIMPLIFIED METHOD FOR CALCULATING THE ATMOSPHERIC HEATING RATE BY ABSORPTION OF SOLAR RADIATION IN THE STRATOSPHERE AND MESOSPHERE**

T. SHIMAZAKI and L. C. HELMLE (Informatics, Inc., Palo Alto, Calif.) Jan. 1979 34 p refs  
(NASA-TP-1398; A-7557) Avail: NTIS HC A04/MF A01 CSCL 04B

ATMOSPHERIC HEATING, NUMERICAL ANALYSIS, RADIATION ABSORPTION, SOLAR RADIATION

**N79-17413\*#** Tennessee Univ. Space Inst., Tullahoma.

**PROCEEDINGS OF THE 2ND ANNUAL WORKSHOP ON METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS**

W. FROST, ed., D. W. CAMP, ed., and D. E. DURHAM, ed. Mar. 1978 259 p refs Workshop held at Tullahoma, Tenn., 28-30 Mar. 1978; sponsored in part by FAA and NOAA Prepared in part by NASA. Marshall Space Flight Center  
(NAS8-29584)  
(NASA-CP-2057; FAA-RD-78-99) Avail: NTIS HC A12/MF A01 CSCL 04B

AIRCRAFT HAZARDS, CONFERENCES, FLIGHT SAFETY, METEOROLOGY, RESEARCH, STORMS

**N79-19569\*#** National Weather Service, Camp Springs, Md.  
**SYNOPTIC ANALYSES, 5-, 2-, 1-, AND 0.4-MILLIBAR SURFACES FOR JULY 1976 THROUGH JUNE 1977**

Dec. 1978 226 p refs  
(NASA ORDER P-59946-G)  
(NASA-RP-1032) Avail: NTIS HC A11/MF A01 CSCL 04B

Meteorological rocketsonde and satellite radiance data are employed for analyses of a continuing series of high-altitude constant-pressure charts. The automated methods of data processing and the objective analysis procedures are described. Broad-scale analyses of temperature and geopotential height for the Northern Hemisphere 5-, 2-, 1-, and 0.4-mb surfaces are presented for each week of the period July 1976 through June 1977. Brief discussions of the variations of the temperature and height fields throughout the period are also given. Author

**N79-20575\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THIRD NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WEATHER AND CLIMATE PROGRAM SCIENCE REVIEW**

E. R. KREINS, ed. 1977 304 p refs Proc. held at Greenbelt, Md., 29-30 Nov. 1977  
(NASA-CP-2029) Avail: NTIS HC A14/MF A01 CSCL 04B

CLIMATOLOGY, CONFERENCES, STORMS (METEOROL- OGY), WEATHER FORECASTING

**N79-20633\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**FOURTH NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WEATHER AND CLIMATE PROGRAM SCIENCE REVIEW**

E. R. KREINS, ed. 1979 396 p refs Proc. held at Greenbelt, Md., 24-25 Jan. 1979  
(NASA-CP-2076) Avail: NTIS HC A17/MF A01 CSCL 04B

CLIMATE, CONFERENCES, NASA PROGRAMS, WEATHER

## 47 METEOROLOGY AND CLIMATOLOGY

**N79-21720\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **THE NASA-AMES RESEARCH CENTER STRATOSPHERIC AEROSOL MODEL. 2. SENSITIVITY STUDIES AND COMPARISON WITH OBSERVATORIES**

O. B. TOON, R. P. TURCO (R and D Associates, Marina del Rey, Calif.), P. HAMILL, C. S. KIANG (National Center for Atmospheric Research), and R. C. WHITTEN Apr. 1979 70 p refs (NASA-TP-1363; A-7551) Avail: NTIS HC A04/MF A01 CSCI 04A

AEROSOLS, ATMOSPHERIC MODELS, DATA CORRELATION, STRATOSPHERE

**N79-21721\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **THE NASA-AMES RESEARCH CENTER STRATOSPHERIC AEROSOL MODEL. 1. PHYSICAL PROCESSES AND COMPUTATIONAL ANALOGS**

R. P. TURCO (R and D Associates, Marina del Rey, Calif.), P. HAMILL, O. B. TOON, R. C. WHITTEN, and C. S. KIANG (National Center for Atmospheric Research) Apr. 1979 100 p refs (NASA-TP-1362; A-7532) Avail: NTIS HC A05/MF A01 CSCI 04A

AEROSOLS, ATMOSPHERIC MODELS, MATHEMATICAL MODELS, STRATOSPHERE

**N79-22708\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **RF RADIATION PRODUCED BY INTRACLOUD LIGHTNING DISCHARGES**

D. M. LEVINE, E. P. KRIDER, and C. D. WEIDMAN Apr. 1979 17 p refs (NASA-TP-1454; G-7951-03) Avail: NTIS HC A02/MF A01 CSCI 04B

ELECTROMAGNETIC RADIATION, LIGHTNING, RADIO FREQUENCY DISCHARGE

**N79-22709\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ANALYSES OF EARTH RADIATION BUDGET DATA FROM UNRESTRICTED BROADBAND RADIOMETERS ON THE ESSA 7 SATELLITE**

W. L. WEAVER and F. B. HOUSE (Drexel Univ.) May 1979 56 p refs (NASA-TP-1402; L-12587) Avail: NTIS HC A04/MF A01 CSCI 04B

ATMOSPHERIC HEAT BUDGET, EARTH ATMOSPHERE, EARTH RADIATION BUDGET, ESSA 7 SATELLITE, INFRARED RADIOMETERS

**N79-31885\*#** Texas A&M Univ., College Station.

### **CONVECTIVE RAINFALL ESTIMATION FROM DIGITAL GOES-1 INFRARED DATA**

G. L. SICKLER and A. H. THOMPSON Washington NASA Sep. 1979 96 p refs (NASA-RP-1034) Avail: NTIS HC A05/MF A01 CSCI 04B

An investigation was conducted to determine the feasibility of developing and objective technique for estimating convective rainfall from digital GOES-1 infrared data. The study area was a 240 km by 240 km box centered on College Station, Texas (Texas A and M University). The Scofield and Oliver (1977) rainfall estimation scheme was adapted and used with the digital geostationary satellite data. The concept of enhancement curves with respect to rainfall approximation is discussed. Rain gauge rainfall analyses and satellite-derived rainfall estimation analyses were compared. The correlation for the station data pairs (observed versus estimated rainfall amounts) for the convective portion of the storm was 0.92. It was demonstrated that a fairly accurate objective rainfall technique using digital geostationary infrared satellite data is feasible. The rawinsonde and some synoptic data that were used in this investigation came from NASA's Atmospheric Variability Experiment, AVE 7.

G.Y.

**N79-32796\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **THE WAVE STRUCTURES OF THE EADY MODEL OF BAROCLINIC INSTABILITY**

J. M. HYUN and W. W. FOWLIS Washington Oct. 1979 26 p refs

(NASA-TP-1548) Avail: NTIS HC A03/MF A01 CSCI 04B  
ATMOSPHERIC MODELS, BAROCLINIC WAVES, FLOW STABILITY, FLUID DYNAMICS, PROPAGATION MODES, WAVE PROPAGATION

**N79-32797\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EARTH RADIATION BUDGET SCIENCE, 1978**

1978 79 p refs Workshop held at Williamsburg, Va., 28-30 Mar. 1978

(NASA-CP-2100) Avail: NTIS HC A05/MF A01 CSCI 04B  
CLIMATOLOGY, CLOUD PHYSICS, CONFERENCES, DYNAMIC MODELS, EARTH RADIATION BUDGET, ENERGY BUDGETS, RADIATION MEASUREMENT, RADIATIVE HEAT TRANSFER, SATELLITE OBSERVATION, TERRESTRIAL RADIATION

**N79-33722\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **SUMMARY OF THE NASA/MSFC FY-79 SEVERE STORM AND LOCAL WEATHER RESEARCH REVIEW**

Sep. 1979 92 p Presented at the NASA/MSFC FY-79 Severe Storm and Local Weather Res. Rev., Huntsville, Ala. 12-13 Sep. 1979

(NASA-CP-2105) Avail: NTIS HC A06/MF A01 CSCI 04B  
ATMOSPHERIC ELECTRICITY, CLOUD PHYSICS, CONFERENCES, EARTH IONOSPHERE, NASA PROGRAMS, STORMS, WEATHER

**N80-12661\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

### **WIND STUDY FOR HIGH ALTITUDE PLATFORM DESIGN**

T. W. STRGANAC Washington Dec. 1979 288 p refs (NASA-RP-1044) Avail: NTIS HC A13/MF A01 CSCI 04B

An analysis of upper air winds was performed to define the wind environment at potential operating altitudes for high altitude powered platform concepts. Wind conditions of the continental United States, Pacific area (Alaska to Sea of Japan), and European area (Norwegian and Mediterranean Sea) were obtained using a representative network of sites selected based upon adequate high altitude sampling, geographic dispersion, and observed upper wind patterns. A data base of twenty plus years of rawinsonde gathered wind information was used in the analysis. Annual variations from surface to 10 mb pressure altitude were investigated to encompass the practical operating range for the platform concepts. Parametric analysis for the United States and foreign areas was performed to provide a basis for vehicle system design tradeoffs. This analysis of wind magnitudes indicates the feasibility of annual operation at a majority of sites and more selective seasonal operation for the extreme conditions between the pressure altitudes of 100 to 25 mb based upon the assumed design speeds.

R.C.T.

### **N80-14633\*# Tennessee Univ. Space Inst., Tullahoma. PROCEEDINGS, THIRD ANNUAL WORKSHOP ON METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS**

D. W. CAMP, ed. and W. FROST, ed. Apr. 1979 190 p refs Proc. held at Tullahoma, Tenn., 3-5 Apr. 1979; sponsored by NASA, NOAA, and FAA

(NAS8-32692)  
(NASA-CP-2104; FAA-RD-79-49) Avail: NTIS HC A09/MF A01 CSCI 04B

AIR TRAFFIC CONTROL, CONFERENCES, FLIGHT SAFETY, METEOROLOGY

**N80-14641\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE STRATOSPHERE: PRESENT AND FUTURE**

R. D. HUDSON, ed. and E. I. REED, ed. Dec. 1979 443 p refs

(NASA-RP-1049) Avail: NTIS HC A19/MF A01 CSCL 04B

The present status of stratospheric science is discussed. The three basic elements of stratospheric science-laboratory measurements, atmospheric observations, and theoretical studies are presented along with an attempt to predict, with reasonable confidence, the effect on ozone of particular anthropogenic sources of pollution. For individual titles, see N80-14642 through N80-14648.

**N80-15726\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**STRATOSPHERIC AEROSOL MODIFICATION BY SUPERSONIC TRANSPORT OPERATIONS WITH CLIMATE IMPLICATIONS**

O. B. TOON, R. P. TURCO (R and D Assoc., Marina Del Rey, Calif.), J. B. POLLACK, R. C. WHITTEN, I. G. POPPOFF, and P. HAMILL (Systems and Applied Sciences Corp., Hampton, Va.) Jan. 1980 20 p refs

(NASA-RP-1058; A-7938) Avail: NTIS HC A02/MF A01 CSCL 04B

The potential effects on stratospheric aerosols of supersonic transport emissions of sulfur dioxide gas and submicron size soot granules are estimated. An interactive particle-gas model of the stratospheric aerosol is used to compute particle changes due to exhaust emissions, and an accurate radiation transport model is used to compute the attendant surface temperature changes. It is shown that a fleet of several hundred supersonic aircraft, operating daily at 20 km, could produce about a 20% increase in the concentration of large particles in the stratosphere. Aerosol increases of this magnitude would reduce the global surface temperature by less than 0.01 K. Author

**N80-16675\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THUNDERSTORM-ENVIRONMENT INTERACTIONS DETERMINED WITH THREE-DIMENSIONAL TRAJECTORIES**

G. S. WILSON Washington Jan. 1980 163 p refs

(NASA-RP-1054) Avail: NTIS HC A08/MF A01 CSCL 04B

Diagnostically determined three dimensional trajectories were used to reveal some of the scale interaction processes that occur between convective storms and their environment. Data from NASA's fourth Atmospheric Variability Experiment are analyzed. Two intense squall lines and numerous reports of severe weather occurred during the period. Convective storm systems with good temporal and spatial continuity are shown to be related to the development and movement of short wave circulation systems aloft that propagate eastward within a zonal mid tropospheric wind pattern. These short wave systems are found to produce the potential instability and dynamic triggering needed for thunderstorm formation. The environmental flow patterns, relative to convective storm systems, are shown to produce large upward air parcel movements in excess of 50 mb/3h in the immediate vicinity of the storms. The air undergoing strong lifting originates as potentially unstable low level air traveling into the storm environment from southern and southwestern directions. The thermo and hydrodynamical processes that lead to changes in atmospheric structure before, during, and after convective storm formation are described using total time derivatives of pressure or net vertical displacement, potential temperature, and vector wind calculated by following air parcels. R.C.T.

**N80-16676\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

**THE ROLE OF SATELLITE ALTIMETRY IN CLIMATE STUDIES**

C. L. PARSONS Washington Jan. 1980 32 p refs

(NASA-TP-1570) Avail: NTIS HC A03/MF A01 CSCL 04B

AIR WATER INTERACTIONS, ALTIMETERS, CLIMATOLOGY, ICE MAPPING, MARINE METEOROLOGY, OCEANOGRAPHY, POLAR CAPS, SEA ICE, SEASAT 1, SKYLAB PROGRAM

**N80-16682\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

**RESULTS OF THE AUGUST 1977 SOVIET AND AMERICAN METEOROLOGICAL ROCKETSONDE INTERCOMPARISON HELD AT WALLOPS ISLAND, VIRGINIA**

F. J. SCHMIDLIN, J. R. DUKE, A. I. IVANOVSKY, and Y. M. CHERNYSHENKO Feb. 1980 193 p refs Prepared in cooperation with the Hydrometeorological Service of the USSR (NASA-RP-1053) Avail: NTIS HC A09/MF A01 CSCL 04B

A coordinated program of rocketsonde investigations along about 60 deg E and 70 deg W between the United States and U.S.S.R. is discussed. The rocketsonde instruments used by the U.S. and U.S.S.R. were compared and the results are presented. The U.S. Super Loki Datasonde and the U.S.S.R. M100B rocketsonde are discussed. Results indicate that the U.S./U.S.S.R. rocketsonde measurement agreement improved since the 1973 intercomparisons. It was learned that the mean of the differences of the temperatures compare to within 6 C at about 60 km and to within 2 C near 50 km. Wind measurements were also found to agree. A.W.H.

**N80-20986\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SIMULATION STUDY OF A GEOMETRIC SHAPE FACTOR TECHNIQUE FOR ESTIMATING EARTH-EMITTED RADIANT FLUX DENSITIES FROM WIDE-FIELD-OF-VIEW RADIATION MEASUREMENTS**

W. L. WEAVER and R. N. GREEN Washington Apr. 1980 29 p refs

(NASA-TP-1629; L-13373) Avail: NTIS HC A02/MF A01

CSCL 04B

EARTH SURFACE, RADIANT FLUX DENSITY, RADIATION MEASUREMENT, RADIOMETERS

**N80-21927\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LIGHTNING TECHNOLOGY: PROCEEDINGS OF A TECHNICAL SYMPOSIUM**

Apr. 1980 444 p refs Symp. held in Hampton, Va., 22-24 Apr. 1980; sponsored in cooperation with Fla. Inst. of Technol. and DOT

(NASA-CP-2128; L-13666; FAA-RD-80-30) Avail: NTIS HC

A19/MF A01 CSCL 04B

AIRCRAFT HAZARDS, CONFERENCES, ELECTROMAGNETIC SHIELDING, LIGHTNING, MATHEMATICAL MODELS, MEASURING INSTRUMENTS

**N80-22924\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE STRATCOM 8 EFFORT**

E. I. REED, ed. Apr. 1980 221 p refs

(NASA-TP-1640) Avail: NTIS HC A10/MF A01 CSCL 04B

NITROGEN OXIDES, OZONE, PHOTOCHEMICAL REACTIONS, STRATOSPHERE, ULTRAVIOLET RADIATION

**N80-23933\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**RATE STATISTICS FOR RADIO NOISE FROM LIGHTNING**

D. M. LEVINE, R. MENEGHINI (Maryland Univ., College Park), and S. A. TRETTER May 1980 34 p refs

(NASA-TP-1665; G80F5117) Avail: NTIS HC A03/MF A01

CSCL 04B

LIGHTNING, RADIO FREQUENCY INTERFERENCE, STATISTICAL ANALYSIS

## 47 METEOROLOGY AND CLIMATOLOGY

**N80-23934\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Space Sciences Lab.

### **ICE CRYSTAL GROWTH IN A DYNAMIC THERMAL DIFFUSION CHAMBER**

V. W. KELLER May 1980 216 p refs

(NSF ATM-75-10935; NSF ATM-77-07995)

(NASA-TP-1651) Avail: NTIS HC A10/MF A01 CSCL 04B

CONTROLLED ATMOSPHERES, CRYSTAL GROWTH, ICE FORMATION, NUCLEATION, TEST CHAMBERS, THERMAL DIFFUSION

**N80-26999\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **EXPLORATORY MEETING ON AIRBORNE DOPPLER LIDAR WIND VELOCITY MEASUREMENTS**

G. H. FICHTEL, ed., J. W. KAUFMAN, ed., and W. W. VAUGHAN, ed. Apr. 1980 57 p refs Meeting held in Huntsville, Ala., 1 Apr. 1980

(NASA-CP-2140) Avail: NTIS HC A04/MF A01 CSCL 04B

AIRBORNE EQUIPMENT, CONFERENCES, LASER DOPPLER VELOCIMETERS, OPTICAL RADAR, WIND VELOCITY MEASUREMENT

**N81-10637\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **FIRST SCIENTIFIC WORKING GROUP MEETING OF AIRBORNE DOPPLER LIDAR WIND VELOCITY MEASUREMENT PROGRAM**

J. W. KAUFMAN, ed. Oct. 1980 135 p refs Meeting held in Huntsville, Ala., 25-26 Aug. 1980

(NASA-CP-2161) Avail: NTIS HC A07/MF A01 CSCL 04B

CONFERENCES, DOPPLER RADAR, LASER APPLICATIONS, METEOROLOGICAL FLIGHT, WIND MEASUREMENT

**N81-13593\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **DECONVOLUTION AND ANALYSIS OF WIDE-ANGLE LONGWAVE RADIATION DATA FROM NIMBUS 6 EARTH RADIATION BUDGET EXPERIMENT FOR THE FIRST YEAR**

T. D. BESS, R. N. GREEN, and G. L. SMITH Dec. 1980 62 p refs

(NASA-TP-1746; L-13873) Avail: NTIS HC A04/MF A01

CSCL 04B

DATA REDUCTION, EARTH RADIATION BUDGET, EARTH RADIATION BUDGET EXPERIMENT, LONG WAVE RADIATION, RESOLUTION, SPHERICAL HARMONICS

**N81-14555\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **PROCEEDINGS: FOURTH ANNUAL WORKSHOP ON METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS**

W. FROST, ed. and D. W. CAMP, ed. Mar. 1980 287 p refs Workshop held in Tullahoma, Tenn., 25-27 Mar. 1980; sponsored in part by FAA and NOAA Prepared in cooperation with Tennessee Univ. Space Inst.

(NAS8-32692)

(NASA-CP-2139; FAA-RD-80-67) Avail: NTIS HC A13/MF A01

CSCL 04B

AIR TRAFFIC CONTROL, AIRCRAFT SAFETY, CONFERENCES, METEOROLOGICAL PARAMETERS

**N81-15639\*#** Texas A&M Univ., College Station. Dept. of Meteorology.

### **DETERMINATION OF WIND FROM NIMBUS 6 SATELLITE SOUNDING DATA**

W. E. CARLE and J. R. SCOGGINS Jan. 1981 83 p refs

Sponsored by NASA

(DAAG29-76-G-0078)

(NASA-RP-1072; M-329) Avail: NTIS HC A05/MF A01 CSCL 04B

Objective methods of computing upper level and surface wind fields from NIMBUS 6 satellite sounding data are developed. These methods are evaluated by comparing satellite derived and rawinsonde wind fields on gridded constant pressure charts in four geographical regions. Satellite-derived and hourly observed surface wind fields are compared. Results indicate that the best satellite-derived wind on constant pressure charts is a geostrophic wind derived from highly smoothed fields of geopotential height. Satellite-derived winds computed in this manner and rawinsonde winds show similar circulation patterns except in areas of small height gradients. Magnitudes of the standard deviation of the differences between satellite derived and rawinsonde wind speeds range from approximately 3 to 12 m/sec on constant pressure charts and peak at the jet stream level. Fields of satellite-derived surface wind computed with the logarithmic wind law agree well with fields of observed surface wind in most regions. Magnitudes of the standard deviation of the differences in surface wind speed range from approximately 2 to 4 m/sec, and satellite derived surface winds are able to depict flow across a cold front and around a low pressure center. Author

**N81-15640\*#** Texas A&M Univ., College Station. Dept. of Meteorology.

### **A COMPARATIVE ANALYSIS OF RAWINSONDE AND NIMBUS 6 AND TIROS N SATELLITE PROFILE DATA**

J. R. SCOGGINS, W. E. CARLE, K. KNIGHT, V. MOYER, and N. M. CHENG Jan. 1981 84 p refs Sponsored by NASA

(DAAG29-76-G-0078)

(NASA-RP-1070; M-327) Avail: NTIS HC A05/MF A01 CSCL 04B

Comparisons are made between rawinsonde and satellite profiles in seven areas for a wide range of surface and weather conditions. Variables considered include temperature, dewpoint temperature, thickness, precipitable water, lapse rate of temperature, stability, geopotential height, mixing ratio, wind direction, wind speed, and kinematic parameters, including vorticity and the advection of vorticity and temperature. In addition, comparisons are made in the form of cross sections and synoptic fields for selected variables. Sounding data from the NIMBUS 6 and TIROS N satellites were used. Geostrophic wind computed from smoothed geopotential heights provided large scale flow patterns that agreed well with the rawinsonde wind fields. Surface wind patterns as well as magnitudes computed by use of the log law to extrapolate wind to a height of 10 m agreed with observations. Results of this study demonstrate rather conclusively that satellite profile data can be used to determine characteristics of large scale systems but that small scale features, such as frontal zones, cannot yet be resolved. Author

**N81-16678\*#** Texas A&M Univ., College Station. Dept. of Meteorology.

### **ATMOSPHERIC STRUCTURE DETERMINED FROM SATELLITE DATA**

K. S. KNIGHT and J. R. SCOGGINS 1981 107 p refs Sponsored in part by NASA

(DAAG29-76-G-0078)

(NASA-RP-1071; M-328) Avail: NTIS HC A06/MF A01 CSCL 04B

The capabilities of the Nimbus 6 satellite sounding data for use in synoptic analysis were considered and interpreted. An evaluation of the ability of the satellite sounding data to detect and depict structural features of the atmosphere was made on the basis of vertical profiles of average difference and standard deviation of differences between satellite and rawinsonde data at

nine pressure levels from 850 to 100 mb; and constant pressure charts and cross sections of satellite, rawinsonde and difference values. Results indicate that satellite measurements of temperature as well as the vertical lapse rate and horizontal gradient of temperature are accurate enough to show large scale patterns but not to precisely define fronts or tropopause; satellite measurements of dew point temperature are smoothed enough to severely reduce contrasts between air masses across fronts; the magnitude of the standard deviation of differences between rawinsonde and satellite data for most variables increases with the synoptic activity in the region; and the most reliable variables to examine from satellite data for depiction of synoptic features are the temperature equivalent potential temperature and mixing ratio.

T.M.

**N81-16679\*#** Texas A&M Univ., College Station. Dept. of Meteorology.

**COMPARISONS BETWEEN NIMBUS 6 SATELLITE AND RAWINSONDE SOUNDINGS FOR SEVERAL GEOGRAPHICAL AREAS**

N. M. CHENG and J. R. SCOGGINS 1981 76 p refs Sponsored in part by NASA

(DAAG29-76-G-0078)

(NASA-RP-1073; M-330) Avail: NTIS HC A05/MF A01 CSCL 04B

Good agreement between satellite and weighted (linearly interpolated) rawinsonde temperature and temperature derived parameters was found in most instances with the poorest agreement either near the tropopause region or near the ground. However, satellite moisture data are highly questionable. The smallest discrepancy between satellite and weighted mean rawinsonde temperature and parameters derived from temperature was found over water and the largest discrepancy was found over mountains. Cumulative frequency distributions show that discrepancies between satellite and rawinsonde data can be represented by a normal distribution except for dew point temperature.

T.M.

**N81-19709\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**VAS DEMONSTRATION SOUNDING WORKSHOP: THE PROCEEDINGS OF A SATELLITE SOUNDING WORKSHOP**

D. L. ENDRES, ed. and L. W. UCCELLINI, ed. 1980 83 p refs Conf. held at Goddard Space Flight Center, Greenbelt, Md., 15 Jul. 1980

(NASA-CP-2157) Avail: NTIS HC A05/MF A01 CSCL 04B

ATMOSPHERIC SOUNDING, CONFERENCES, SATELLITE SOUNDING, SATELLITE-BORNE INSTRUMENTS, TIROS N SATELLITE

**N81-21685\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ANALYSIS OF ATMOSPHERIC OZONE LEVELS AT COMMERCIAL AIRPLANE CRUISE ALTITUDES IN WINTER AND SPRING, 1976 - 1977**

J. D. HOLDEMAN and G. D. NASTROM (Control Data Corp., Minneapolis) Apr. 1981 18 p refs

(DOT-FA78WAI-893)

(NASA-TP-1807; FAA-EE-81-1; E-468) Avail: NTIS HC A02/MF A01 CSCL 04B

AIR SAMPLING, AIRCRAFT COMPARTMENTS, CABIN ATMOSPHERES, COMMERCIAL AIRCRAFT, GLOBAL AIR SAMPLING PROGRAM, OZONOMETRY

**N81-21686\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**GODDARD LABORATORY FOR ATMOSPHERIC SCIENCE, COLLECTED REPRINTS 1978-1979, VOLUME 1**

W. C. SKILLMAN, ed. and E. R. KREINS, ed. Mar. 1981 565 p refs

(NASA-TP-1788-VOL-1) Avail: NTIS HC A24/MF A01 CSCL 04B

ATMOSPHERIC SOUNDING, EARTH ATMOSPHERE, METEOROLOGY, NASA PROGRAMS, ROCKET SOUNDING, SATELLITE SOUNDING, WEATHER

**N81-21693\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**GODDARD LABORATORY FOR ATMOSPHERIC SCIENCES, COLLECTED REPRINTS 1978 - 1979, VOLUME 2**

W. C. SKILLMAN and E. R. KREINS Mar. 1981 521 p refs 2 Vol.

(NASA-TP-1788-VOL-2) Copyright Avail: NTIS HC A22/MF A01 CSCL 04B

EARTH HYDROSPHERE, MICROWAVE SENSORS, NASA PROGRAMS, OCEANOGRAPHY, SATELLITE SOUNDING

**N81-22658\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**A COMPARATIVE STATISTICAL STUDY OF LONG-TERM AGROCLIMATIC CONDITIONS AFFECTING THE GROWTH OF US WINTER WHEAT: DISTRIBUTIONS OF REGIONAL MONTHLY AVERAGE PRECIPITATION ON THE GREAT PLAINS AND THE STATE OF MARYLAND AND THE EFFECT OF AGROCLIMATIC CONDITIONS ON YIELD IN THE STATE OF KANSAS**

J. WELKER Apr. 1981 189 p refs

(NASA-TP-1724; REPT-80F5125) Avail: NTIS HC A09/MF A01 CSCL 04B

AGRICULTURE, AGROCLIMATOLOGY, ANNUAL VARIATIONS, CROP GROWTH, KANSAS, MARYLAND, PRECIPITATION (METEOROLOGY), WHEAT YIELD

**N81-23761\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ENERGETICS OF A SUDDEN STRATOSPHERIC WARMING SIMULATED WITH A THREE-DIMENSIONAL, SPECTRAL, QUASI-GEOSTROPHIC MODEL**

K. V. HAGGARD and W. L. GROSE May 1981 30 p refs

(NASA-TP-1847; L-14245) Avail: NTIS HC A03/MF A01 CSCL 04B

ATMOSPHERIC HEATING, ATMOSPHERIC MODELS, ATMOSPHERIC PHYSICS, ATMOSPHERIC TEMPERATURE, STRATOSPHERE

**N82-12715\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THE NUMERICAL STUDIES PROGRAM FOR THE ATMOSPHERIC GENERAL CIRCULATION EXPERIMENT (AGCE) FOR SPACELAB FLIGHTS**

W. W. FOWLIS, ed. and M. H. DAVIS, ed. (Univ. Space Research Association, Boulder, Colo.) Nov. 1981 65 p refs Proc. of Meeting held in Boulder, Colo., 14-15 Apr. 1981

(NASA-CP-2200; M-366) Avail: NTIS HC A04/MF A01 CSCL 04B

ATMOSPHERIC CIRCULATION, ATMOSPHERIC PHYSICS, AXISYMMETRIC FLOW, BAROCLINIC WAVES, EARTH ATMOSPHERE, FLOW GEOMETRY



## 47 METEOROLOGY AND CLIMATOLOGY

**N82-13620\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPARISON OF DATA INVERSION TECHNIQUES FOR REMOTELY SENSED WIDE-ANGLE OBSERVATIONS OF EARTH EMITTED RADIATION**

R. N. GREEN Dec. 1981 46 p refs  
(NASA-TP-1924; L-14591) Avail: NTIS HC A03/MF A01  
CSCL 04B

CONVOLUTION INTEGRALS, DATA REDUCTION, ENERGY BUDGETS, FIELD OF VIEW, RADIANT FLUX DENSITY, TERRESTRIAL RADIATION

**N82-15677\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CLOUD-ENCOUNTER AND PARTICLE-CONCENTRATION VARIABILITIES FROM GASP DATA**

G. D. NASTROM (Control Data Corp., Minneapolis), J. D. HOLDEMAN (NASA, Lewis Research Center, Cleveland), and R. E. DAVIS Dec. 1981 245 p refs  
(NASA-TP-1886; L-14483) Avail: NTIS HC A11/MF A01  
CSCL 04B

CLOUDS, GLOBAL AIR SAMPLING PROGRAM, ICE, METEOROLOGICAL PARAMETERS, PARTICLE DENSITY (CONCENTRATION), STATISTICAL ANALYSIS, VARIABILITY

**N82-16660\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**NASA/MSFC FY-81 ATMOSPHERIC PROCESSES RESEARCH REVIEW**

R. E. TURNER, comp. Dec. 1981 161 p refs Review held in Huntsville, Ala., 1-3 Sep. 1981  
(NASA-CP-2204; M-367) Avail: NTIS HC A08/MF A01 CSCL 04B

EARTH OBSERVATIONS (FROM SPACE), METEOROLOGICAL PARAMETERS, PROGRAMS, STORMS (METEOROLOGY), UPPER ATMOSPHERE, WEATHER

**N82-24781\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**METEOROLOGICAL SATELLITES: PAST, PRESENT, AND FUTURE**

May 1982 61 p refs Proc. of the Session on Meteorol. Satellites at the AIAA 20th Aerospace Sci. Meeting, Orlando, Fla., 11-14 Jan. 1982  
(NASA-CP-2227; NAS 1.55:2227) Avail: NTIS HC A04/MF A01 CSCL 04B

CONFERENCES, HISTORIES, METEOROLOGICAL PARAMETERS, METEOROLOGICAL SATELLITES, SATELLITE OBSERVATION

**N82-24790\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**POWER SPECTRAL MEASUREMENTS OF CLEAR-AIR TURBULENCE TO LONG WAVELENGTHS FOR ALTITUDES UP TO 14,000 METERS**

H. N. MURROW, W. E. MCCAIN, and R. H. RHYNE Apr. 1982 163 p refs  
(NASA-TP-1979; L-14829; NAS 1.60:1979) Avail: NTIS HC A08/MF A01 CSCL 04B

CLEAR AIR TURBULENCE, DATA ACQUISITION, JET STREAMS (METEOROLOGY), POWER SPECTRA, WAVELENGTHS

**N82-28880\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**USER'S GUIDE FOR THE TOTAL-OZONE MAPPING SPECTROMETER (TOMS) INSTRUMENT FIRST YEAR OZONE T DATA SET**

A. J. FLEIG, K. F. KLENK (Systems and Applied Sciences Corp., Bladensburg, Md.), P. K. BHARTIA (Systems and Applied Sciences Corp., Bladensburg, Md.), and D. GORDON (Systems and Applied Sciences Corp., Bladensburg, Md.) Jun. 1982 50 p refs  
(NASA-RP-1096; NAS 1.61:1096) Avail: NTIS HC A03/MF A01 CSCL 04B

The TOMS experiment and algorithms are described. Detailed information on the data available on computer tape is provided.

Author

**N82-29826\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**USER'S GUIDE FOR THE SOLAR BACKSCATTERED ULTRAVIOLET (SBUV) INSTRUMENT FIRST YEAR OZONE-S DATA SET**

A. J. FLEIG, K. F. KLENK, P. K. BHARTIA, D. GORDON, and W. H. SCHNEIDER Jun. 1982 69 p refs Prepared in cooperation with Systems and Applied Sciences Corp., Bladensburg, Md. (NAS5-26753)  
(NASA-RP-1095; REPT-82FO136; NAS 1.61:1095) Avail: NTIS HC A04/MF A01 CSCL 04B

Total-ozone and ozone vertical profile results for Solar Backscattered Ultraviolet/Total Ozone Mapping Spectrometer (SBUV/TOMS) Nimbus 7 operation from November 1978 to November 1979 are available. The algorithm used have been thoroughly tested, the instrument performance has been examined in details, and the ozone results have been compared with Dobson, Umkehr, balloon, and rocket observations. The accuracy and precision of the satellite ozone data are good to at least within the ability of the ground truth to check and are self-consistent to within the specifications of the instrument. The 'SBUV User's Guide' describes the SBUV experiment and algorithms used. Detailed information on the data available on computer tape is provided including how to order tapes from the National Space Science Data Center.

J.M.S.

**N83-14824\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**A STABILITY ANALYSIS OF AVE-4 SEVERE WEATHER SOUNDINGS**

D. L. JOHNSON Nov. 1982 139 p refs  
(NASA-TP-2045; NAS 1.60:2045) Avail: NTIS HC A07/MF A01 CSCL 04B

STORMS (METEOROLOGY), THERMODYNAMICS, VERTICAL DISTRIBUTION, WEATHER FORECASTING, WIND PROFILES

**N83-14825\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THE CONCEPTION, GROWTH, ACCOMPLISHMENTS AND FUTURE OF METEOROLOGICAL SATELLITES**

W. W. VAUGHAN, comp. Washington Nov. 1982 105 p refs Proc. of the 62d Ann. Meeting held at San Antonio, Tex., 11-15 Jan. 1982; sponsored by the American Meteorological Society  
(NASA-CP-2257; NAS 1.55:2257) Avail: NTIS HC A06/MF A01 CSCL 04B

METEOROLOGICAL SATELLITES, NIMBUS PROJECT, SATELLITE OBSERVATION, TIROS N SERIES SATELLITES, TIROS PROJECT



**N83-14835\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NIMBUS 6 RANDOM ACCESS MEASUREMENT SYSTEM APPLICATIONS EXPERIMENTS**

C. E. COTE, ed., R. TAYLOR, ed., and E. GILBERT, ed. Oct. 1982 103 p

(NASA-SP-457; LC-82-14553; NAS 1.21:457) Avail: NTIS HC A06/MF A01 CSCL 04B

The advantages of a technique in which data collection platforms randomly transmit signal to a polar orbiting satellite, thus eliminating satellite interrogation are demonstrated in investigations of the atmosphere; oceanographic parameters; Arctic regions and ice conditions; navigation and position location; and data buoy development. For individual titles, see N83-14836 through N83-14862.

**N83-19391\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**NASA/MSFC FY-82 ATMOSPHERIC PROCESSES RESEARCH REVIEW Summary Report**

R. E. TURNER, comp. 1982 243 p refs Meeting held at Huntsville, Ala., 19-21 Oct. 1982

(NASA-CP-2259; NAS 1.55:2259) Avail: NTIS HC A11/MF A01 CSCL 04B

AIR CURRENTS, METEOROLOGICAL PARAMETERS, STORMS (METEOROLOGY), UPPER ATMOSPHERE, WEATHER

**N83-24028\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**VISSR ATMOSPHERIC SOUNDER (VAS) RESEARCH REVIEW**

J. R. GREAVES, ed. Washington Mar. 1983 54 p refs Rev. held in Greenbelt, Md., 16-17 Jun. 1982 Original contains color illustrations

(NASA-CP-2253; REPT-83F0188; NAS 1.55:2253) Avail: NTIS HC A04/MF A01 CSCL 04B

ATMOSPHERIC MOISTURE, ATMOSPHERIC SOUNDING, CLOUDS, VISIBLE INFRARED SPIN SCAN RADIOMETER, WATER VAPOR, WEATHER FORECASTING

**N83-25265\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SUMMARY PROCEEDINGS OF A WIND SHEAR WORKSHOP**

J. H. ENDERS (Flight Safety Foundation, Arlington, Va.), W. W. MELVIN (Air Line Pilots Assoc., Denison, Tex.), W. FROST (Tennessee Univ. Space Inst., Tullahoma, Tenn.), and D. W. CAMP Apr. 1983 20 p Workshop Held at Tennessee Univ. Space Inst., Tullahoma, Tenn., 25 Oct. 1982

(NASA-CP-2270; NAS 1.55:2270) Avail: NTIS HC A02/MF A01 CSCL 04B

AIRCRAFT SAFETY, COMPUTERIZED SIMULATION, DOPPLER RADAR, FLIGHT CREWS, FLIGHT TRAINING, VORTEX GENERATORS, WARNING SYSTEMS, WIND SHEAR

**N83-28828\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**USER'S GUIDE FOR THE SOLAR BACKSCATTERED ULTRAVIOLET (SBUV) AND THE TOTAL OZONE MAPPING SPECTROMETER (TOMS) RUT-S AND RUT-T DATA SETS: OCTOBER 31, 1978 TO NOVEMBER 1, 1980**

A. J. FLEIG, D. F. HEATH, K. F. KLENK (Systems and Applied Sciences Corp., Bladensburg, Md.), N. OSLIK (Systems and Applied Sciences Corp., Bladensburg, Md.), K. D. LEE (Systems and Applied Sciences Corp., Bladensburg, Md.), H. PARK (Systems and Applied Sciences Corp., Bladensburg, Md.), P. K. BHARTIA (Systems and Applied Sciences Corp., Bladensburg, Md.), and D. GORDON (Systems and Applied Sciences Corp., Bladensburg, Md.) Jun. 1983 135 p refs

(NAS5-27393) (NASA-RP-1112; REPT-910; NAS 1.61:1112) Avail: NTIS HC A07/MF A01 CSCL 04B

Raw data from the Solar Backscattered Ultraviolet/Total Ozone Mapping Spectrometer (SBUV/TOMS) Nimbus 7 operation are available on computer tape. These data are contained on two

separate sets of RUTs (Raw Units Tapes) for SBUV and TOMS, labelled RUT-S and RUT-T respectively. The RUT-S and RUT-T tapes contain uncalibrated radiance and irradiance data, housekeeping data, wavelength and electronic calibration data, instrument field-of-view location and solar ephemeris information. These tapes also contain colocated cloud, terrain pressure and snow/ice thickness data, each derived from an independent source. The 'RUT User's Guide' describes the SBUV and TOMS experiments, the instrument calibration and performance, operating schedules, and data coverage, and provides an assessment of RUT-S and -T data quality. It also provides detailed information on the data available on the computer tapes. S.L.

**N83-33494\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**NASA/MSFC FY-83 ATMOSPHERIC PROCESSES RESEARCH REVIEW**

R. E. TURNER, comp. Aug. 1983 163 p Program review held at Huntsville, Ala., 24-25 May 1983

(NASA-CP-2281; M-417; NAS 1.55:2281) Avail: NTIS HC A08/MF A01 CSCL 04B

CONFERENCES, DOPPLER RADAR, LIGHTNING, MESOSCALE PHENOMENA, STORMS (METEOROLOGY), UPPER ATMOSPHERE, WEATHER, WIND (METEOROLOGY)

**N83-36587\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**NASA/MSFC FY-83 ATMOSPHERIC RESEARCH REVIEW**

R. E. TURNER, comp. and D. W. CAMP, comp. Washington Oct. 1983 34 p refs Rev. held in Huntsville, Ala., 24-25 May 1983

(NASA-CP-2288; NAS 1.55:2288) Avail: NTIS HC A03/MF A01 CSCL 04B

AIRCRAFT HAZARDS, AIRPORTS, GUSTS, METEOROLOGY, WIND SHEAR

**N84-16720\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**USER'S GUIDE FOR SBUV/TOMS OZONE DERIVATIVE PRODUCTS**

A. J. FLEIG, C. WELLEMAYER, N. OSLIK, D. LEE, J. MILLER, and R. MAGATANI Jan. 1984 91 p refs

(NAS5-27393) (NASA-RP-1116; NAS 1.61:1116) Avail: NTIS HC A05/MF A01 CSCL 04B

A series of products are available derived from the total-ozone and ozone vertical profile results for the Solar Backscattered Ultraviolet/Total-Ozone Mapping Spectrometer (SBUV/TOMS) Nimbus-7 operation. Products available are (1) orbital height-latitude cross sections of the SBUV profile data, (2) daily global total ozone contours in polar coordinates, (3) daily averages of total ozone in global 5x5 degree latitude-longitude grid, (4) daily, monthly and quarterly averages of total ozone and profile data in 10 degree latitude zones, (5) tabular presentation of zonal means, (6) daily global total ozone and profile contours in polar coordinates. The "Derivative Products User's Guide" describes each of these products in detail, including their derivation and presentation format. Information is provided on how to order the tapes and microfilm from the National Space Science Data Center. Author

**N84-24044\*#** National Aeronautics and Space Administration. Washington, D.C.

**A SPATIAL MODEL OF WIND SHEAR AND TURBULENCE FOR FLIGHT SIMULATION Ph.D. Thesis - Colorado State Univ.**

C. W. CAMPBELL May 1984 131 p refs

(NASA-TP-2313; NAS 1.60:2313) Avail: NTIS HC A07/MF A01 CSCL 04B

ATMOSPHERIC MODELS, ATMOSPHERIC TURBULENCE, COMPUTERIZED SIMULATION, FLIGHT SIMULATION, ISOTROPIC TURBULENCE, THREE DIMENSIONAL FLOW, TURBULENT FLOW, WIND PROFILES, WIND SHEAR

## 47 METEOROLOGY AND CLIMATOLOGY

**N84-31865\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CLIMATOLOGY OF OZONE AT ALTITUDES FROM 19,000 AT 59,000 FEET BASED ON COMBINED GASP AND OZONESONDE DATA**

W. H. JASPERSON (Control Data Corp.), G. D. NASTROM (Control Data Corp.), and J. D. HOLDEMAN Aug. 1984 363 p refs (DOT-FA78WAI-893)

(NASA-TP-2303; E-1626; NAS 1.60:2303) Avail: NTIS HC A16/MF A01 CSCL 04B

CLIMATOLOGY, DATA ACQUISITION, DATA CORRELATION, GLOBAL AIR SAMPLING PROGRAM, OZONE

**N84-34829\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**NASA/MSFC FY-84 ATMOSPHERIC PROCESSES RESEARCH REVIEW**

W. W. VAUGHAN, comp. and F. PORTER, comp. Washington Sep. 1984 223 p refs Rev. held in Huntsville, Ala., 30 Apr. and 2-3 May 1984

(NASA-CP-2329; M-458; NAS 1.55:2329) Avail: NTIS HC A10/MF A01 CSCL 04B

ATMOSPHERIC CIRCULATION, ATMOSPHERIC MODELS, ATMOSPHERIC SOUNDING, BACKSCATTERING, BAROCLINIC INSTABILITY, CLOUDS (METEOROLOGY), CONFERENCES, CYCLONES, DOPPLER RADAR, EARTH ATMOSPHERE, LIGHTNING, MESOSCALE PHENOMENA, OPTICAL RADAR, PRECIPITATION (METEOROLOGY), THUNDERSTORMS, WIND MEASUREMENT

**N85-14360\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**GLOBAL SCALE ATMOSPHERIC PROCESSES RESEARCH PROGRAM REVIEW**

B. A. WORLEY, ed. and C. A. PESLEN, ed. Washington Nov. 1984 233 p refs Rev. held in Greenbelt, Md., 8-10 Aug. 1984

(NASA-CP-2344; NAS 1.55:2344) Avail: NTIS HC A11/MF A01 CSCL 04B

ATMOSPHERIC CIRCULATION, GLOBAL ATMOSPHERIC RESEARCH PROGRAM, PLANETARY WAVES, REMOTE SENSING, WEATHER FORECASTING

**N85-16343\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTERNATIONAL AEROSPACE AND GROUND CONFERENCE ON LIGHTNING AND STATIC ELECTRICITY. 1984 TECHNICAL PAPERS. SUPPLEMENT**

Washington Dec. 1984 65 p refs Conf. held in Orlando, Fla., 26-28 Jun. 1984; sponsored in cooperation with NASA, Army, Navy, AF, DOT, Florida Inst. of Tech., IEEE, Society of Automotive Engineers, United Kingdom Civil Aviation Authority, United Kingdom Royal Aircraft Establishment, and Culham Lab.

(NASA-CP-2356; L-15910; NAS 1.55:2356; NADC-84104-20-SUPPL) Avail: NTIS HC A04/MF A01 CSCL 04B

CONFERENCES, LIGHTNING, STATIC ELECTRICITY

**N85-16351\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**AN EVALUATION AND COMPARISON OF VERTICAL PROFILE DATA FROM THE VISSR ATMOSPHERIC SOUNDER (VAS)**

G. J. JEDLOVEC Washington Jan. 1985 40 p refs (NASA-TP-2425; NAS 1.60:2425) Avail: NTIS HC A03/MF A01 CSCL 04B

ALGORITHMS, EVALUATION, MOISTURE, RAWINSONDES, STATISTICAL ANALYSIS, TEMPERATURE PROFILES, VISIBLE INFRARED SPIN SCAN RADIOMETER

**N85-20605\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THREE-DIMENSIONAL BAROCLINIC INSTABILITY OF A HADLEY CELL FOR SMALL RICHARDSON NUMBER**

B. N. ANTAR and W. W. FOWLIS Mar. 1985 33 p refs (NASA-TP-2450; NAS 1.60:2450) Avail: NTIS HC A03/MF A01 CSCL 04B

BAROCLINIC INSTABILITY, FLUID DYNAMICS, PERTURBATION, RICHARDSON NUMBER

**N85-21878\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**A NEW NASA/MSFC MISSION ANALYSIS GLOBAL CLOUD COVER DATA BASE**

S. C. BROWN and W. R. JEFFRIES, III (Computer Sciences Corp., Huntsville, Ala.) Mar. 1985 17 p refs

(NASA-TP-2448; NAS 1.60:2448) Avail: NTIS HC A02/MF A01 CSCL 03B

CLIMATOLOGY, CLOUD COVER, DATA BASES, NEPHANALYSIS, NORTHERN HEMISPHERE, SOUTHERN HEMISPHERE

**N86-11735\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS**

D. W. CAMP, ed. and W. FROST, ed. (Tennessee Univ. Space Inst.) Sep. 1985 144 p refs Workshop held in Tullahoma, Tenn., 26-28 Oct. 1983; sponsored by NASA, NOAA, FAA, DOD, and Office of the Federal Coordinator for Meteorology

(NAS8-36177) (NASA-CP-2388; NAS 1.55:2388) Avail: NTIS HC A07/MF A01 CSCL 04B

AIRCRAFT SAFETY, FLIGHT CHARACTERISTICS, FLIGHT HAZARDS, METEOROLOGICAL PARAMETERS, METEOROLOGICAL SERVICES, WEATHER FORECASTING

**N86-13866\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**UNDERSTANDING CLIMATE: A STRATEGY FOR CLIMATE MODELING AND PREDICTABILITY RESEARCH, 1985-1995**

O. THIELE, ed. and R. A. SCHIFFER, ed. Oct. 1985 38 p refs

(NASA-RP-1158; REPT-85B0489; NAS 1.61:1158) Avail: NTIS HC A03/MF A01 CSCL 04B

The emphasis of the NASA strategy for climate modeling and predictability research is on the utilization of space technology to understand the processes which control the Earth's climate system and its sensitivity to natural and man-induced changes and to assess the possibilities for climate prediction on time scales of from about two weeks to several decades. Because the climate is a complex multi-phenomena system, which interacts on a wide range of space and time scales, the diversity of scientific problems addressed requires a hierarchy of models along with the application of modern empirical and statistical techniques which exploit the extensive current and potential future global data sets afforded by space observations. Observing system simulation experiments, exploiting these models and data, will also provide the foundation for the future climate space observing system, e.g., Earth observing system (EOS), 1985; Tropical Rainfall Measuring Mission (TRMM) North, et al. NASA, 1984. Author

**N86-13867\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**VAS DEMONSTRATION: (VISSR ATMOSPHERIC SOUNDER) DESCRIPTION Final Report**

H. E. MONTGOMERY and L. W. UCCELLINI Oct. 1985 193 p refs

(NASA-RP-1151; REPT-85F0274; NAS 1.61:1151) Avail: NTIS HC A09/MF A01 CSCL 04B

The VAS Demonstration (VISSR Atmospheric Sounder) is a project designed to evaluate the VAS instrument as a remote sensor of the Earth's atmosphere and surface. This report describes

## OCEANOGRAPHY

Includes biological, dynamic, and physical oceanography; and marine resources.

the instrument and ground processing system, the instrument performance, the validation as a temperature and moisture profiler compared with ground truth and other satellites, and assesses its performance as a valuable meteorological tool. The report also addresses the availability of data for scientific research. Author

**N86-23160\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SITE SELECTION AND DIRECTIONAL MODELS OF DESERTS USED FOR ERBE VALIDATION TARGETS**

W. F. STAYLOR Apr. 1986 15 p refs  
(NASA-TP-2540; L-16041; NAS 1.60:2540) Avail: NTIS HC A02/MF A01 CSCL 04B

ACCURACY, DESERTS, EARTH RADIATION BUDGET EXPERIMENT, MODELS, RADIANCE, SITE SELECTION

**N86-24082\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**CURRENT SCIENTIFIC ISSUES IN LARGE SCALE ATMOSPHERIC DYNAMICS**

T. L. MILLER, comp. Washington Jan. 1986 46 p refs  
Workshop held in Huntsville, Ala., 20-21 Jun. 1985  
(NASA-CP-2410; M-506; NAS 1.55:2410) Avail: NTIS HC A03/MF A01

ATMOSPHERIC CIRCULATION, BAROCLINIC WAVES, BLOCKING, CONFERENCES, CYCLOGENESIS, FRONTS (METEOROLOGY), GRAVITY WAVES, OROGRAPHY, PLANETARY WAVES, SYNOPTIC METEOROLOGY

**N86-24090\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATISTICAL ANALYSIS OF DIRECT-STRIKE LIGHTNING DATA (1980 TO 1982)**

L. D. LEE, G. B. FINELLI, M. E. THOMAS, and F. L. PITTS Jan. 1984 30 p refs  
(NASA-TP-2252; L-15686; NAS 1.60:2252) Avail: NTIS HC A03/MF A01 CSCL 04B

AIRCRAFT HAZARDS, ELECTROMAGNETIC MEASUREMENT, EXTREMUM VALUES, LIGHTNING, QUANTILES, STATISTICAL ANALYSIS

**N86-25924\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DESCRIPTION OF DATA ON THE NIMBUS 7 LIMS MAP ARCHIVE TAPE: TEMPERATURE AND GEOPOTENTIAL HEIGHT**

K. V. HAGGARD, E. E. REMSBERG, W. L. GROSE, J. M. RUSSELL, III, B. T. MARSHALL (SASC Technologies, Inc., Hampton, Va.), and G. LINGENFELSER (Analytical Mechanics Associates, Inc., Hampton, Va.) May 1986 55 p refs  
(NASA-TP-2553; L-16071; NAS 1.60:2553) Avail: NTIS HC A04/MF A01 CSCL 04B

EARTH LIMB, MAPPING, NIMBUS 7 SATELLITE, STRATOSPHERE, SYNOPTIC METEOROLOGY

**N86-28574\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SURFACE RADIATION BUDGET FOR CLIMATE APPLICATIONS**

J. T. SUTTLES, ed. and G. OHRING, ed. (National Oceanic and Atmospheric Administration, Washington, D. C.) Aug. 1986 123 p  
(NASA-RP-1169; L-16133; NAS 1.61:1169) Avail: NTIS HC A07/MF A01 CSCL 04B

The Surface Radiation Budget (SRB) consists of the upwelling and downwelling radiation fluxes at the surface, separately determined for the broadband shortwave (SW) (0 to 5 micron) and longwave (LW) (greater than 5 microns) spectral regions plus certain key parameters that control these fluxes, specifically, SW albedo, LW emissivity, and surface temperature. The uses and requirements for SRB data, critical assessment of current capabilities for producing these data, and directions for future research are presented. B.G.

**N77-16675\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FREE DRIFTING BUOYS**

1974 378 p refs Presented at Drift Buoy Symp., Hampton, Va., 22-23 May 1974; Sponsored by AIAA Tech. Comm. on Marine Systems and Technol.

(NASA-CP-2003) Avail: NTIS HC A17/MF A01 CSCL 08C  
BUOYS, OPTICAL TRACKING, RADIO TRACKING, TRACKING RADAR

**N78-12644\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**REMOTE SENSING OF OCEANIC PARAMETERS DURING THE SKYLAB/GAMEFISH EXPERIMENT**

K. H. FALLER Nov. 1977 43 p refs  
(NASA-RP-1012; JSC-S-468) Avail: NTIS HC A03/MF A01 CSCL 08J

Effort to demonstrate the feasibility of using remotely acquired information to assess and monitor the distribution of oceanic gamefish are described. Data supplied by Skylab and aircraft surveying an area in the Gulf of Mexico with thermal and optical radiometers and cameras were used in conjunction with oceanographic data provided by surface vessels to explore a relationship between oceanographic parameters and remotely acquired data. Thermal scanner imagery and precision radiometric thermometer data obtained by the two aircraft were combined to provide a composite surface temperature map of the test area. Spectral radiometer data were studied in conjunction with surface measurements of chlorophyll-a and turbidity, and several models were developed which predicted these two oceanic parameters from the radiance data. Contour maps of the chlorophyll-a content and turbidity were developed from the best chlorophyll and turbidity models and from surface measurements. Basic problems concerning the remote measurement of the Sicchi extinction depth are discussed, and suggestions are made for improving the remote measurement turbidity. Author

**N78-12645\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LABORATORY MEASUREMENTS OF UPWELLED RADIANCE AND REFLECTANCE SPECTRA OF CALVERT, BALL, JORDAN, AND FELDSPAR SOIL SEDIMENTS**

C. H. WHITLOCK, J. W. USRY, W. G. WITTE, and E. A. GURGANUS Dec. 1977 36 p refs  
(NASA-TP-1039; L-11854) Avail: NTIS HC A03/MF A01 CSCL 08J

RADIANCE, REFLECTANCE, SEDIMENTS, SOILS, SPECTRAL SIGNATURES, UPWELLING WATER

**N78-21737\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

**REMOTE SENSING OF GULF STREAM USING GEOS-3 RADAR ALTIMETER**

C. D. LEITAO, N. E. HUANG (EG and G Washington Anal. Serv. Center, Inc., Pocomoke City, Md.), and C. G. PARRA Apr. 1978 34 p refs  
(NASA-TP-1209) Avail: NTIS HC A03/MF A01 CSCL 08J

ALTIMETERS, GEOS 3 SATELLITE, GULF STREAM, REMOTE SENSORS, TOPOGRAPHY

**N79-28863\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SEA-SURFACE TEMPERATURE AND SALINITY MAPPING FROM REMOTE MICROWAVE RADIOMETRIC MEASUREMENTS OF BRIGHTNESS TEMPERATURE**  
 C. B. HANS-JUERGEN, B. M. KENDALL, and J. C. FEDORS Dec. 1977 29 p refs  
 (NASA-TP-1077; L-11763) Avail: NTIS HC A03/MF A01 CSCL 08J

BRIGHTNESS TEMPERATURE, MAPPING, MICROWAVE EQUIPMENT, OCEAN SURFACE, RADIOMETERS, SALINITY

**N79-28864\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**INVESTIGATION OF EFFECTS OF BACKGROUND WATER ON UPWELLED REFLECTANCE SPECTRA AND TECHNIQUES FOR ANALYSIS OF DILUTE PRIMARY-TREATED SEWAGE SLUDGE**  
 C. H. WHITLOCK, J. W. USRY, W. G. WITTE, F. H. FARMER, and E. A. GURGANUS Aug. 1979 36 p refs  
 (NASA-TP-1446; L-12694) Avail: NTIS HC A03/MF A01 CSCL 08J

ENVIRONMENTAL MONITORING, REFLECTANCE, REMOTE SENSORS, SPECTRAL SIGNATURES, WATER

**N79-31890\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SPECTRAL MEASUREMENTS OF OCEAN-DUMPED WASTES TESTED IN THE MARINE UPWELLED SPECTRAL SIGNATURE LABORATORY**  
 W. G. WITTE, J. W. USRY, C. H. WHITLOCK, and E. A. GURGANUS Washington Sep. 1979 34 p refs  
 (NASA-TP-1480; L-12906) Avail: NTIS HC A03/MF A01 CSCL 08C

INDUSTRIAL WASTES, REMOTE SENSORS, WASTE DISPOSAL

**N80-12718\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**REMOTE SENSING AND PROBLEMS OF THE HYDROSPHERE**  
 E. D. GOLDBERG, ed. (Scripps Institution of Oceanography, La Jolla, Calif.) Washington Dec. 1979 67 p refs Workshop held at Warner Springs, Calif., 29-31 Jan. 1979; sponsored by NASA, Langley Res. Center and NASA, Washington (NASA-CP-2109; L-13404) Avail: NTIS HC A04/MF A01 CSCL 08J

EARTH HYDROSPHERE, MARINE ENVIRONMENTS, REMOTE SENSORS

**N80-23956\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**REMOTE SENSING AND PROBLEMS OF THE HYDROSPHERE. A FOCUS FOR FUTURE RESEARCH**  
 E. D. GOLDBERG, ed. (Scripps Inst. of Oceanography, La Jolla, Calif.) Apr. 1980 35 p refs Meeting held at New Orleans, 9-11 May 1979  
 (NASA-CP-2132; L-13645) Avail: NTIS HC A03/MF A01 CSCL 08C

CONFERENCES, EARTH HYDROSPHERE, REMOTE SENSORS

**N81-31801\*#** National Aeronautics and Space Administration, Washington, D.C.  
**OCEANIC LIDAR**  
 K. L. CARDER, ed. Aug. 1981 45 p refs Workshop presented at Greenbelt, MD., 13-14 Nov. 1980  
 (NASA-CP-2194) Avail: NTIS HC A03/MF A01 CSCL 08C  
 CHLOROPHYLLS, COASTAL ZONE COLOR SCANNER, CONFERENCES, FLUORESCENCE, LASER APPLICATIONS, OCEANOGRAPHIC PARAMETERS, OPTICAL RADAR

**N82-10661\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CHESAPEAKE BAY PLUME STUDY: SUPERFLUX 1980**  
 J. W. CAMPBELL, ed. and J. P. THOMAS, ed. (National Marine Fisheries Service, Highland, N.J.) Oct. 1981 504 p refs Symp. held at Williamsburg, Va., 21-23 Jan. 1981; sponsored in part by National Marine Fisheries Service, NOAA, and Dept. of Commerce

(NASA-CP-2188; L-14680; NOAA-NEMP-111-81-ABCDG-0042)

Avail: NTIS HC A22/MF A01 CSCL 08C

CHESAPEAKE BAY (US), CONFERENCES, ECOSYSTEMS, ESTUARIES, REMOTE SENSING

**N82-16683\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

**NOSS ALTIMETER ALGORITHM SPECIFICATIONS**  
 D. W. HANCOCK, R. G. FORSYTHE, and J. D. MCMILLAN (Washington Analytical Services Center, Pocomoke City, Md.) Jan. 1982 112 p refs

(NASA-RP-1083) Avail: NTIS HC A06/MF A01 CSCL 08C

A description of all algorithms required for altimeter processing is given. Each description includes title, description, inputs/outputs, general algebraic sequences and data volume. All required input/output data files are described and the computer resources required for the entire altimeter processing system were estimated. The majority of the data processing requirements for any radar altimeter of the Seasat-1 type are scoped. Additions and deletions could be made for the specific altimeter products required by other projects.  
 T.M.

**N83-19411\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VISIBLE ABSORBANCE SPECTRA: A BASIS FOR IN SITU AND PASSIVE REMOTE SENSING OF PHYTOPLANKTON CONCENTRATION AND COMMUNITY COMPOSITION**

F. H. FARMER, O. JARRETT, JR., and C. A. BROWN, JR. Feb. 1983 35 p refs

(NASA-TP-2094; L-15490; NAS 1.60:2094) Avail: NTIS HC A03/MF A01 CSCL 08A

ABSORPTION SPECTRA, CHEMICAL COMPOSITION, PHYTOPLANKTON, PLANKTON, POPULATIONS

**N83-24133\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MEASUREMENTS OF SPECTRAL ATTENUATION COEFFICIENTS IN THE LOWER CHESAPEAKE BAY**

W. M. HOUGHTON Apr. 1983 36 p refs

(NASA-TP-2130; L-15406; NAS 1.60:2130) Avail: NTIS HC A03/MF A01 CSCL 08J

ABSORPTION, ABSORPTIVITY, ATTENUATION, ESTUARIES, LIGHT TRANSMISSION, OCEANOGRAPHY

**N84-10718\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ANTARCTIC SEA ICE, 1973 - 1976: SATELLITE PASSIVE-MICROWAVE OBSERVATIONS**

H. J. ZWALLY, J. C. COMISO, C. L. PARKINSON, W. J. CAMPBELL (Geological Survey, Takoma, Wash.), F. D. CARSEY (Jet Propulsion Lab., California Inst. of Tech., Pasadena), and P. GLOERSEN Washington 1983 216 p refs Original document contains color illustrations

(NASA-SP-459; NAS 1.21:459; LC-83-600167) Avail: NTIS HC A10/MF A01; SOD HC \$21.00 CSCL 08L

Data from the Electrically Scanning Microwave Radiometer (ESMR) on the Nimbus 5 satellite are used to determine the extent and distribution of Antarctic sea ice. The characteristics of the southern ocean, the mathematical formulas used to obtain quantitative sea ice concentrations, the general characteristics of the seasonal sea ice growth/decay cycle and regional differences, and the observed seasonal growth/decay cycle for individual years and interannual variations of the ice cover are discussed. The sea ice data from the ESMR are presented in the form of color-coded maps of the Antarctic and the southern oceans. The

maps show brightness temperatures and concentrations of pack ice averaged for each month, 4-year monthly averages, and month-to-month changes. Graphs summarizing the results, such as areas of sea ice as a function of time in the various sectors of the southern ocean are included. The images demonstrate that satellite microwave data provide unique information on large-scale sea ice conditions for determining climatic conditions in polar regions and possible global climatic changes. J.M.S.

**N85-26028\*#** National Aeronautics and Space Administration. Goddard Inst. for Space Studies, New York, N.Y.

#### **NORTH ATLANTIC DEEP WATER FORMATION**

T. BENNETT, ed., W. S. BROECKER, ed., and J. HANSEN, ed. Dec. 1984 74 p refs Symp. held in Palisades, N.Y., Feb. 1985 Sponsored by NASA. Goddard Space Flight Center (NASA-CP-2367; NAS 1.55:2367) Avail: NTIS HC A04/MF A01 CSCL 08J

AIR WATER INTERACTIONS, ATLANTIC OCEAN, CONVECTIVE FLOW, DISSOLVED GASES, GREENLAND, ICE, MIXING, OCEAN TEMPERATURE, PERIODIC VARIATIONS, SALINITY, WATER CIRCULATION

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### LIFE SCIENCES (GENERAL)

**N77-33780\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

#### **BIOMEDICAL RESULTS FROM SKYLAB**

R. S. JOHNSTON, ed. and L. F. DIETLEIN, ed. Washington 1977 502 p refs Original contains color illustrations (NASA-SP-377; LC-76-54287) Avail: NTIS MF A01; SOD HC as 033-000-00648-9 CSCL 06P

Biomedical data from various experiments and observations reflect the physiological responses of spacecrews to prolonged space flight stress. For individual titles, see N77-33781 through N77-33836.

**N78-11663\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

#### **THE USE OF NONHUMAN PRIMATES IN SPACE**

R. C. SIMMONDS, ed. and G. H. BOURNE, ed. (Emory Univ.) Sep. 1977 390 p refs Proc. held at Moffett Field, Calif., 2-4 Dec. 1974 (NASA-CP-005; A-6133) Avail: NTIS HC A17/MF A01 CSCL 06C

AEROSPACE MEDICINE, BIODYNAMICS, CONFERENCES, EXPERIMENT DESIGN, PRIMATES, SPACE FLIGHT STRESS, WEIGHTLESSNESS

**N78-18673\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

#### **DESIGN OF A BLOOD-FREEZING SYSTEM FOR LEUKEMIA RESEARCH**

T. E. WILLIAMS and T. A. CYGNAROWICZ Feb. 1978 43 p refs (NASA-TP-1165; G-7702-F9) Avail: NTIS HC A03/MF A01 CSCL 06E

BLOOD, FREEZING, HEMATOLOGY, LEUKEMIAS, MEDICAL EQUIPMENT, RESEARCH AND DEVELOPMENT

**N79-19592\*#** National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.

#### **RADAR, INSECT POPULATION ECOLOGY, AND PEST MANAGEMENT**

C. R. VAUGHN, ed., W. WOLF, ed. (Dept. of Agriculture, Beltsville, Md.), and W. KLASSEN, ed. Mar. 1979 252 p refs Workshop held at Wallops Island, Va., 2-4 May 1978; sponsored in part by US Dept. of Agriculture (NASA-CP-2070) Avail: NTIS HC A12/MF A01 CSCL 06C

ECOLOGY, INSECTS, POPULATIONS, RADAR

**N84-11720\*#** Texas Univ., Austin. Dept. of Botany.

#### **THE REGULATORY FUNCTIONS OF CALCIUM AND THE POTENTIAL ROLE OF CALCIUM IN MEDIATING GRAVITATIONAL RESPONSES IN CELLS AND TISSUES**

S. J. ROUX, ed. Nov. 1983 295 p refs Workshop held in Bethesda, Md., 16-18 Sep. 1982 (NSG-7480)

(NASA-CP-2286; NAS 1.55:2286) Avail: NTIS HC A13/MF A01 CSCL 06B

CALCIUM, CELLS (BIOLOGY), CONFERENCES, GRAVIRECEPTORS, PHYSIOLOGICAL RESPONSES, TISSUES (BIOLOGY)

**N84-18829\*#** National Aeronautics and Space Administration. Washington, D.C.

#### **NASA SPACE BIOLOGY PROGRAM. EIGHTH ANNUAL SYMPOSIUM'S PROGRAM AND ABSTRACTS**

T. W. HALSTEAD, ed. Feb. 1984 121 p refs Symp. held in Arlington, Va., 12-14 Oct. 1983 (NASA-CP-2299; EBT-3; NAS 1.55:2299) Avail: NTIS HC A06/MF A01 CSCL 06C

ABSTRACTS, ANIMALS, BIOSYNTHESIS, CONFERENCES, EXOBIOLOGY, GRAVIRECEPTORS, METABOLISM, PLANTS (BOTANY)

**N84-30665\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

#### **GLOBAL BIOLOGY RESEARCH PROGRAM: BIOGEOCHEMICAL PROCESSES IN WETLANDS**

D. S. BARTLETT, ed. Washington Aug. 1984 43 p refs Workshop held in Arlington, 22-24 Mar. 1983 (NASA-CP-2316; L-15791; NAS 1.55:2316) Avail: NTIS HC A03/MF A01 CSCL 13B

AIR WATER INTERACTIONS, BIOGEOCHEMISTRY, CYCLES, DATA BASES, EXCHANGING, GEOGRAPHY, WETLANDS

**N85-26054\*#** National Aeronautics and Space Administration. Washington, D.C.

#### **NASA SPACE BIOLOGY PROGRAM: 9TH ANNUAL SYMPOSIUM Abstracts Only**

T. W. HALSTEAD Apr. 1985 128 p refs Symp. held in Harper's Ferry, W. Va., 6-9 Nov. 1984 (NASA-CP-2336; NAS 1.55:2336) Avail: NTIS HC A07/MF A01 CSCL 06C

ANIMALS, CONFERENCES, GRAVITATIONAL EFFECTS, METABOLISM, PLANTS (BOTANY), SPACE FLIGHT

**N85-32708\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

#### **THE EVOLUTION OF COMPLEX AND HIGHER ORGANISMS**

D. Milne, ed. (Evergreen State Coll.), D. RAUP, ed. (Chicago Univ.), J. BILLINGHAM, ed., K. NIKLAUS, ed. (Cornell Univ., Ithaca, N.Y.), and K. PADIEN, ed. (California Univ., Berkeley) 1985 113 p refs Original contains color illustrations (NASA-SP-478; A-9363; NAS 1.21:478; LC-85-7159) Avail: NTIS HC A06/MF A01; SOD HC \$8.50 as 033-000-00951-8 CSCL 06C

The evolution of Phanerozoic life has probably been influenced by extraterrestrial events and properties of the Earth-Moon system that have not, until now, been widely recognized. Tide range, gravitational strength, the Earth's axial tilt, and other planetary properties provide background conditions whose effects on

## 51 LIFE SCIENCES (GENERAL)

evolution may be difficult to distinguish. Solar flares, asteroid impacts, supernovae, and passage of the solar system through galactic clouds can provide catastrophic changes on the Earth with consequent characteristic extinctions. Study of the fossil record and the evolution of complex Phanerozoic life can reveal evidence of past disturbances in space near the Earth. Conversely, better understanding of environmental influences caused by extraterrestrial factors and properties of the solar system can clarify aspects of evolution, and may aid in visualizing life on other planets with different properties. Author

**N86-21097\*#** National Aeronautics and Space Administration, Washington, D.C.

### **THE HUMAN FACTOR: BIOMEDICINE IN THE MANNED SPACE PROGRAM TO 1980**

J. A. PITTS 1985 402 p refs *In its History Series* (NASW-3213)

(NASA-SP-4213; NAS 1.21:4213; LC-85-21526) Avail: SOD HC \$23.00 as 033-000-00977-1; NTIS MF A01 CSCL 05E

The purpose of this publication is to provide NASA personnel, NASA managers, and the biomedical and historical research communities a well-documented, historical summary of the content and organization of NASA's biomedical programs from Project Mercury up to the Shuttle program. The publication includes not only a major narrative portion, but appendixes and reference notes. Author

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### **AEROSPACE MEDICINE**

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

**N77-30735\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

### **THE APOLLO-SOYUZ TEST PROJECT: MEDICAL REPORT**

A. E. NICOGOSSIAN, comp. Washington 1977 129 p refs Original contains color illustrations (NASA-SP-411) Avail: NTIS HC A07/MF A01 CSCL 06E

The results of the clinical aspects as well as the preflight and postflight research studies that were performed on the astronauts are presented. Because of the compromised postflight crew health status, not all postflight research procedures could be accomplished. This compromise was the result of the anomalous entrance of toxic gas into the spacecraft cabin during the earth landing sequence. Despite the exposure, the medical data collected are of sufficient interest to warrant inclusion in this official ASTP Medical Report. Author

**N79-10728\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

### **HYPERTHERMIA AS AN ANTINEOPLASTIC TREATMENT MODALITY**

S. A. T. LONG, ed., J. SHAEFFER, ed. (Eastern Va. Med. School), and A. M. EL-MAHDI, ed. (Eastern Va. Med. School) 1978 96 p refs Symp. held at Norfolk, Va., 28 Jan. 1978 (NASA-CP-2051; L-12082) Avail: NTIS HC A05/MF A01 CSCL 06E

CANCER, CONFERENCES, HYPERTHERMIA, RADIATION THERAPY, RADIO FREQUENCY HEATING

**N79-13686\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

### **PHYSIOLOGICAL RESPONSES OF WOMEN TO SIMULATED WEIGHTLESSNESS: A REVIEW OF THE FIRST FEMALE BED-REST STUDY**

H. SANDLER and D. L. WINTER 1978 92 p refs (NASA-SP-430) Avail: NTIS HC A05/MF A01 CSCL 06S

Subjects were exposed to centrifugation, to lower body negative pressure (LBNP), and to exercise stress both before and after bed rest. Areas studied were centrifugation tolerance, fluid electrolyte changes and hematology, tolerance to LBNP, physical working capacity, biochemistries, blood fibrinolytic activity, female metabolic and hormonal responses, circadian alterations, and gynecology. Results were compared with the responses observed in similarly bed-rested male subjects. The bed-rested females showed deconditioning responses similar to those of the males, although with some differences. Results indicate that women are capable of coping with exposure to weightlessness and, moreover, that they may be more sensitive subjects for evaluating countermeasures to weightlessness and developing criteria for assessing applicants for shuttle voyages. G.G.

**N80-15788\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

### **THE PHYSIOLOGICAL BASIS FOR SPACECRAFT ENVIRONMENTAL LIMITS**

J. M. WALIGORA, comp. Washington Nov. 1979 229 p refs (NASA-RP-1045; S-487) Avail: NTIS HC A11/MF A01 CSCL 06K

Limits for operational environments are discussed in terms of acceptable physiological changes. The environmental factors considered are pressure, contaminants, temperature, acceleration, noise, rf radiation, and weightlessness. For individual titles, see N80-15789 through N80-15795.

**N83-16018\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

### **SPACE GERONTOLOGY**

J. MIQUEL, ed. and A. C. ECONOMOS, ed. (Technology, Inc., Mountain View, Calif.) Washington Nov. 1982 125 p refs Workshop held at Moffett Field, Calif., 30-31 Jan. 1978 (NASA-CP-2248; A-8627; NAS 1.55:2248) Avail: NTIS HC A06/MF A01 CSCL 06S

AEROSPACE MEDICINE, AGING (BIOLOGY), BIOASTRONAUTICS, GERIATRICS, GERONTOLOGY

**N83-25349\*#** National Aeronautics and Space Administration, Washington, D.C.

### **SPACE PHYSIOLOGY AND MEDICINE**

A. E. NICOGOSSIAN and J. F. PARKER, JR. (BioTechnology, Inc.) 1982 331 p refs (NASA-SP-447; NAS 1.21:447; LC-82-23047) Avail: NTIS HC \$15.00/MF A01 CSCL 06P

The state of knowledge in space physiology and medicine are reviewed. Overviews of manned space flight, the space environment, spaceflight systems and procedures, physiological adaptation to space flight, health maintenance of space crew members, and medical problems of space flight are presented. S.L.

**N86-23265\*** National Aeronautics and Space Administration, Washington, D.C.

### **AEROSPACE MEDICINE AND BIOLOGY: A CUMULATIVE INDEX TO THE 1985 ISSUES**

Jan. 1986 291 p (NASA-SP-7011(280); NAS 1.21:70011(280)) Avail: NTIS HC A13 CSCL 06E

This publication is a cumulative index to the abstracts contained in the Supplements 268 through 279 of Aerospace Medicine and Biology: A Continuing Bibliography. It includes seven indexes - subject, personal author, corporate source, foreign technology, contract number, report number, and accession number. Author

**N86-32088\*** National Aeronautics and Space Administration, Washington, D.C.

**AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 288)**

1986 69 p  
(NASA-SP-7011(288); NAS 1.21:7011(288)) Avail: NTIS HC A05 CSCL 06E

This bibliography lists 190 reports, articles and other documents introduced into the NASA scientific and technical information system in August 1986. Author

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## BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

**N78-11696\*** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**AN INVESTIGATION OF RIDE QUALITY RATING SCALES**

T. K. DEMPSEY, G. D. COATES (Old Dominion Univ.), and J. D. LEATHERWOOD Nov. 1977 48 p refs  
(NASA-TP-1064) Avail: NTIS HC A03/MF A01 CSCL 05J  
COMFORT, RIDING QUALITY, VIBRATION EFFECTS

**N78-32717\*** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**EFFECT OF VIBRATION DURATION ON HUMAN DISCOMFORT**

S. A. CLEVENSON, T. K. DEMPSEY, and J. D. LEATHERWOOD Sep. 1978 26 p refs  
(NASA-TP-1283; L-12248) Avail: NTIS HC A03/MF A01 CSCL 05H

COMFORT, HUMAN FACTORS ENGINEERING, HUMAN TOLERANCES, PASSENGERS, RANDOM VIBRATION, VIBRATION EFFECTS

**N79-19682\*** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**AIRLINE PILOT SCAN PATTERNS DURING SIMULATED ILS APPROACHES**

A. A. SPADY, JR. Oct. 1978 72 p refs  
(NASA-TP-1250; L-11989) Avail: NTIS HC A04/MF A01 CSCL 05J

AIRCRAFT PILOTS, FLIGHT SIMULATION, INSTRUMENT LANDING SYSTEMS, VISUAL OBSERVATION

**N79-22761\*** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**HUMAN DISCOMFORT RESPONSE TO NOISE COMBINED WITH VERTICAL VIBRATION**

J. D. LEATHERWOOD Apr. 1979 49 p refs  
(NASA-TP-1374; L-12492) Avail: NTIS HC A03/MF A01 CSCL 05H

HUMAN TOLERANCES, NOISE TOLERANCE, RIDING QUALITY, VERTICAL MOTION, VIBRATION EFFECTS

**N79-23662\*** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**DISCOMFORT CRITERIA FOR SINGLE-AXIS VIBRATIONS**

T. K. DEMPSEY, J. D. LEATHERWOOD, and S. A. CLEVENSON May 1979 60 p refs  
(NASA-TP-1422; L-12681) Avail: NTIS HC A04/MF A01 CSCL 05H

HUMAN REACTIONS, HUMAN TOLERANCES, VIBRATION

**N79-25753\*** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**OVERALL LOUDNESS OF STEADY SOUNDS ACCORDING TO THEORY AND EXPERIMENT**

W. L. HOWES Oct. 1979 150 p refs  
(NASA-RP-1001; E-8342) Avail: NTIS MF A01; HC SOD CSCL 05J

A mathematical theory for calculating the loudness of any steady sound from information on its spectrum is constructed from physical principles and psychological and physiological information on mammalian auditory systems. The theory involves filtering, channeling, squaring, half-wave rectification, and time average of the signal. The theory accounts for critical bands for loudness, audibility of sounds consisting of subliminal components, audible beats, periodicity pitch, and pitch of the residue. These and other psychoacoustic phenomena are explained in terms of electrical activity in the peripheral nervous system. Simple approximations for loudness are derived from the more exact formulas. Loudness predictions are compared with a wide variety of published loudness judgement data with considerable success. Author

**N79-33838\*** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**MODELS OF HUMAN OPERATORS IN VISION DEPENDENT TASKS**

M. C. WALLER, ed. Oct. 1979 86 p refs Seminars held at the Human Factors Soc. 1979 Ann. Meeting, Boston, 29 Oct. - 1 Nov. 1979; sponsored in part by Human Factors Soc. Visual Performance Tech. Group  
(NASA-CP-2103; L-13338) Avail: NTIS HC A05/MF A01 CSCL 05J

COMPUTERIZED SIMULATION, HUMAN FACTORS ENGINEERING, MAN MACHINE SYSTEMS, OPERATOR PERFORMANCE

**N80-13769\*** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**EFFECT OF NOISE SPECTRA AND A LISTENING TASK UPON PASSENGER ANNOYANCE IN A HELICOPTER INTERIOR NOISE ENVIRONMENT**

S. A. CLEVENSON and J. D. LEATHERWOOD Dec. 1979 26 p refs  
(NASA-TP-1590; L-13233) Avail: NTIS HC A03/MF A01 CSCL 05I

AIRCRAFT NOISE, AUDITORY PERCEPTION, HELICOPTERS, HUMAN REACTIONS, NOISE TOLERANCE

**N80-34099\*** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**EFFECTS OF MAGNIFICATION AND VISUAL ACCOMMODATION ON AIMPOINT ESTIMATION IN SIMULATED LANDINGS WITH REAL AND VIRTUAL IMAGE DISPLAYS**

R. J. RANDLE, S. N. ROSCOE (New Mexico State Univ., Las Cruces), and J. C. PETITT (California Univ., San Diego) Oct. 1980 29 p refs  
(NASA-TP-1635; A-8104) Avail: NTIS HC A03/MF A01 CSCL 05I

IMAGING TECHNIQUES, LANDING SIMULATION, TRAINING SIMULATORS, VIRTUAL PROPERTIES, VISUAL CONTROL, VISUAL PERCEPTION

**N81-23791\*** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

**EFFECTS OF CURVED APPROACH PATHS AND ADVANCED DISPLAYS ON PILOT SCAN PATTERNS**

R. L. HARRIS, SR. and R. W. MIXON Washington May 1981 29 p refs  
(NASA-TP-1846; L-14229) Avail: NTIS HC A03/MF A01 CSCL 05I

COCKPITS, INSTRUMENT ORIENTATION, PILOT PERFORMANCE, SCANNING, SENSORIMOTOR PERFORMANCE, SENSORY PERCEPTION

**N82-14804\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**INFLUENCE OF DISPLAY AND CONTROL COMPATIBILITY ON PILOT-INDUCED OSCILLATIONS**  
 M. C. WALLER, R. L. HARRIS, SR., and L. H. PERSON, JR.  
 Dec. 1981 40 p refs  
 (NASA-TP-1936; L-14364) Avail: NTIS HC A03/MF A01 CSCL 05I

COCKPIT SIMULATORS, OSCILLATIONS, TERMINAL CONFIGURED VEHICLE PROGRAM, VERTICAL MOTION SIMULATORS

**N83-33538\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**THE WINDOW OF VISIBILITY: A PSYCHOLOGICAL THEORY OF FIDELITY IN TIME-SAMPLED VISUAL MOTION DISPLAYS**  
 A. B. WATSON, A. J. AHUMADA, JR., and J. E. FARRELL Aug. 1983 22 p refs  
 (NASA-TP-2211; A-9270; NAS 1.60:2211) Avail: NTIS HC A02/MF A01 CSCL 05I  
 ACCURACY, COMPUTER GRAPHICS, DISPLAY DEVICES, PSYCHOPHYSIOLOGY

**N83-34579\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EFFECT OF LOW-FREQUENCY TONES AND TURBULENT-BOUNDARY-LAYER NOISE ON ANNOYANCE**  
 K. P. SHEPHERD (Bionetics Corp., Hampton, Va.), J. D. LEATHERWOOD, and S. A. CLEVENSON Sep. 1983 27 p refs  
 (NASA-TP-2202; L-15628; NAS 1.21:2202) Avail: NTIS HC A03/MF A01 CSCL 05I  
 AERODYNAMIC NOISE, HUMAN FACTORS ENGINEERING, LOW FREQUENCIES, SPECTRUM ANALYSIS, TURBULENT BOUNDARY LAYER

**N84-20155\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**EVALUATION OF RIDE QUALITY PREDICTION METHODS FOR HELICOPTER INTERIOR NOISE AND VIBRATION ENVIRONMENTS**  
 J. D. LEATHERWOOD, S. A. CLEVENSON, and D. D. HOLLENBAUGH (USAAVSCOM Research and Technology Labs.) Mar. 1984 47 p refs  
 (DA PROJ. 1L2-62209-AH-76)  
 (NASA-TP-2261; L-15661; NAS 1.60:2261; AVSCOM-TR-84-D-2)  
 Avail: NTIS HC A03/MF A01 CSCL 05H  
 AIRCRAFT NOISE, HELICOPTERS, PREDICTION ANALYSIS TECHNIQUES, RIDING QUALITY

**N84-22162\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**A USER-ORIENTED AND COMPUTERIZED MODEL FOR ESTIMATING VEHICLE RIDE QUALITY**  
 J. D. LEATHERWOOD and L. M. BARKER (System Development Corp., Hampton, Va.) Apr. 1984 45 p refs  
 (NASA-TP-2299; L-15745; NAS 1.60:2299) Avail: NTIS HC A03/MF A01 CSCL 05H  
 COMFORT, COMPUTER PROGRAMS, HUMAN REACTIONS, PSYCHOLOGICAL RESPONSES, RIDING QUALITY

**N86-27920\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**ANALYTICAL TECHNIQUES OF PILOT SCANNING BEHAVIOR AND THEIR APPLICATION**  
 R. L. HARRIS, SR., B. J. GLOVER (PRC Kentron, Inc., Hampton, Va.), and A. A. SPADY, JR. Jul. 1986 46 p refs  
 (NASA-TP-2525; L-15995; NAS 1.60:2525) Avail: NTIS HC A03/MF A01 CSCL 05I  
 DWELL, HISTOGRAMS, HUMAN FACTORS ENGINEERING, OCULOMETERS, PILOT PERFORMANCE, PILOT TRAINING, REAL TIME OPERATION, WORKLOADS (PSYCHOPHYSIOLOGY)

## MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

**N77-27710\*#** Virginia Univ., Charlottesville. Dept. of Engineering Science and Systems.  
**PROCEEDINGS AND FINDINGS OF THE 1976 WORKSHOP ON RIDE QUALITY**  
 A. R. KULTHAU, ed. 20 Dec. 1976 86 p refs Proc. held at Fairlee, Vt., 13-15 Oct. 1976 Sponsored by NASA (DOT-AS-60060)  
 (NASA-CP-2006; DOT-TST-77-38) Avail: NTIS HC A05/MF A01 CSCL 05H  
 HUMAN REACTIONS, RIDING QUALITY, TRANSFER FUNCTIONS, TRANSPORT VEHICLES

**N78-11705\*#** Transportation Systems Center, Cambridge, Mass.  
**SUMMARY REPORT: WORKSHOP ON VEHICLE RIDE QUALITY Final Report, 11-15 Aug. 1975**  
 A. R. KULTHAU, ed. (Virginia Univ.) and A. W. WICHANSKY, ed. Jul. 1977 167 p refs Workshop held at Williamsburg, Va., 13-15 Aug. 1975  
 (NGR-47-005-181)  
 (NASA-CP-2013; DOT-TSC-OST-77-44) Avail: NTIS HC A08/MF A01 CSCL 05H  
 MOTOR VEHICLES, QUALITY CONTROL, URBAN TRANSPORTATION

**N78-31739\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**A PILOT EVALUATION OF TWO G-SEAT CUEING SCHEMES**  
 T. W. SHOWALTER Aug. 1978 34 p refs  
 (NASA-TP-1255; A-7390) Avail: NTIS HC A03/MF A01 CSCL 05H  
 FLIGHT SIMULATION, PERFORMANCE TESTS, TEST PILOTS

**N78-31740\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**DISPOSAL OF RADIOACTIVE IODINE IN SPACE**  
 R. E. BURNS and J. G. DEFIELD Aug. 1978 40 p refs  
 (NASA-TP-1313; M-260) Avail: NTIS HC A03/MF A01 CSCL 06T  
 IODINE, RADIOACTIVE WASTES, SPACE TRANSPORTATION SYSTEM, WASTE DISPOSAL

**N79-11734\*#** Webb Associates, Yellow Springs, Ohio.  
**ANTHROPOMETRIC SOURCE BOOK. VOLUME 1: ANTHROPOMETRY FOR DESIGNERS**  
 E. CHURCHILL, comp., L. L. LAUBACH, comp., J. T. MCCONVILLE, comp., and I. TEBBETTS, comp. Houston, Tex. NASA Jul. 1978 603 p refs  
 (NASA-RP-1024; S-479-VOL-1) Avail: NTIS HC A99/MF A01 CSCL 05H

All the basic areas of anthropometry and its applications to the design of clothing, equipment, and workspaces for manned space flight are presented. For individual titles, see N79-11735 through N79-11743.

**N79-13711\*#** Webb Associates, Yellow Springs, Ohio.  
**ANTHROPOMETRIC SOURCE BOOK. VOLUME 2: A HANDBOOK OF ANTHROPOMETRIC DATA**  
 Jul. 1978 428 p refs For Volume 1 see N79-11734  
 (NASA-RP-1024-VOL-2; S-479-VOL-2) Avail: NTIS HC A19/MF A01 CSCL 05H  
 Volume 2 contains data resulting from surveys of 61 military and civilian populations of both sexes from the U.S., Europe, and



Asia. Some 295 measured variables are defined and illustrated.  
Author

**N79-13712\*#** Webb Associates, Yellow Springs, Ohio.  
**ANTHROPOMETRIC SOURCE BOOK. VOLUME 3: ANNOTATED BIBLIOGRAPHY OF ANTHROPOMETRY**

Jul. 1978 130 p refs For volume 1 see N79-11734  
(NASA-RP-1024-VOL-3; S-479-VOL-3) Avail: NTIS HC A07/MF A01 CSCL 05H

Volume 3 is an annotated bibliography covering a broad spectrum of topics relevant to applied physical anthropology with emphasis on anthropometry and its applications in sizing and design.  
Author

**N79-15588\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

**THE 14TH ANNUAL CONFERENCE ON MANUAL CONTROL**  
Nov. 1978 692 p refs Conf. held at Univ. of Southern Calif., Los Angeles, 25-27 Apr. 1978  
(NASA-CP-2060; A-7615) Avail: NTIS HC A99/MF A01 CSCL 05H

AEROSPACE MEDICINE, CONFERENCES, HUMAN REACTIONS, MAN MACHINE SYSTEMS, MANUAL CONTROL, OPERATOR PERFORMANCE

**N80-15821\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

**SOME HUMAN FACTORS ISSUES IN THE DEVELOPMENT AND EVALUATION OF COCKPIT ALERTING AND WARNING SYSTEMS**

R. J. RANDLE, JR., W. E. LARSEN, and D. H. WILLIAMS  
Washington Jan. 1980 65 p refs  
(NASA-RP-1055; A-7696) Avail: NTIS HC A04/MF A01 CSCL 05H

A set of general guidelines for evaluating a newly developed cockpit alerting and warning system in terms of human factors issues are provided. Although the discussion centers around a general methodology, it is made specifically to the issues involved in alerting systems. An overall statement of the current operational problem is presented. Human factors problems with reference to existing alerting and warning systems are described. The methodology for proceeding through system development to system test is discussed. The differences between traditional human factors laboratory evaluations and those required for evaluation of complex man-machine systems under development are emphasized. Performance evaluation in the alerting and warning subsystem using a hypothetical sample system is explained.  
R.C.T.

**N80-26039\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

**HEAD-UP TRANSITION BEHAVIOR OF PILOTS DURING SIMULATED LOW-VISIBILITY APPROACHES**

R. F. HAINES Jun. 1980 35 p refs  
(NASA-TP-1618; A-8057) Avail: NTIS HC A03/MF A01 CSCL 05H

APPROACH CONTROL, HUMAN FACTORS ENGINEERING, LOW VISIBILITY, MAN MACHINE SYSTEMS, PILOT PERFORMANCE, VISUAL PERCEPTION

**N81-13635\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

**HEAD-UP TRANSITION BEHAVIOR OF PILOTS WITH AND WITHOUT HEAD-UP DISPLAY IN SIMULATED LOW-VISIBILITY APPROACHES**

R. F. HAINES, E. FISCHER, and T. A. PRICE Dec. 1980 37 p refs Prepared in cooperation with San Jose Univ. Foundation, Calif.  
(NASA-TP-1720; A-8296; HUD-10) Avail: NTIS HC A03/MF A01 CSCL 05H

APPROACH CONTROL, FLIGHT SIMULATION, HEAD-UP DISPLAYS, HUMAN FACTORS ENGINEERING, PILOT PERFORMANCE

**N81-13636\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

**COGNITIVE ISSUES IN HEAD-UP DISPLAYS**

E. FISCHER and R. F. HAINES (San Jose State Univ., Calif.)  
Dec. 1980 32 p refs  
(NASA-TP-1711; A-8246) Avail: NTIS HC A03/MF A01 CSCL 01D

APPROACH CONTROL, COGNITION, FLIGHT INSTRUMENTS, HEAD-UP DISPLAYS, PILOT PERFORMANCE

**N81-17711\*#**

**MAGNITUDE OF VISUAL ACCOMMODATION TO A HEAD-UP DISPLAY**

E. F. LEITNER and R. F. HAINES Feb. 1981 12 p refs  
(NASA-TP-1796; A-8379; HUD-15) Avail: NTIS HC A02/MF A01 CSCL 01D

ACCOMMODATION, HEAD-UP DISPLAYS, HUMAN FACTORS ENGINEERING, VISUAL AIDS

**N82-24834\*#** Wisconsin Univ., Madison. Dept. of Horticulture.  
**CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM: USE OF HIGHER PLANTS**

T. W. TIBBITS and D. K. ALFORD (Metropolitan State Coll.) May 1982 86 p refs Proc. of NASA Workshop held at Chicago, Nov. 1979 and at Moffett Field, Calif., Mar. 1980  
(NSG-2405)  
(NASA-CP-2231; NAS 1.55:2231) Avail: NTIS HC A05/MF A01 CSCL 06K

CLOSED ECOLOGICAL SYSTEMS, LIFE SUPPORT SYSTEMS, PLANTS (BOTANY), SPACE FLIGHT FEEDING

**N82-24835\*#** Metrics, Inc., Atlanta, Ga.

**CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM: RESEARCH AND DEVELOPMENT GUIDELINES**

R. M. MASON, ed. and J. L. CARDEN, ed. (Georgia Inst. of Technology) May 1982 99 p refs Proceedings of NASA Workshop held at Moffett Field, Calif., 9-12, 1979  
(NSG-2323)

(NASA-CP-2232; NAS 1.55:2323) Avail: NTIS HC A05/MF A01 CSCL 06K

CLOSED ECOLOGICAL SYSTEMS, LIFE SUPPORT SYSTEMS, PLANTS (BOTANY), SPACE FLIGHT FEEDING

**N82-24836\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

**CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM BIOLOGICAL PROBLEMS**

B. MOORE, III, ed. (New Hampshire Univ.) and R. D. MACELROY, ed. 1982 42 p refs  
(NASA-CP-2233; A-8842; NAS 1.55:2233) Avail: NTIS HC A03/MF A01 CSCL 06K

BIOLOGICAL EFFECTS, CLOSED ECOLOGICAL SYSTEMS, PLANTS (BOTANY), WASTE TREATMENT

**N83-18238\*#** National Aeronautics and Space Administration.  
Goddard Space Flight Center, Greenbelt, Md.

**HUMAN FACTORS CONSIDERATIONS IN SYSTEM DESIGN**

C. M. MITCHELL, ed. (George Mason Univ.), P. M. VANBALEN, ed. (George Mason Univ.), and K. L. MOE, ed. Jan. 1983 381 p refs Symp. held in Greenbelt, Md. and College Park, Md., 25-26 May 1982  
(NAS5-26952)

(NASA-CP-2246; NAS 1.55:2246) Avail: NTIS HC A17/MF A01 CSCL 05H

AUTOMATIC CONTROL, COMMAND AND CONTROL, COMPUTER SYSTEMS DESIGN, CONFERENCES, DATA PROCESSING, DESIGN, DISPLAY DEVICES, HUMAN FACTORS ENGINEERING, INFORMATION MANAGEMENT

## 54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

**N83-30016\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM. FIRST PRINCIPAL INVESTIGATORS MEETING**

B. MOORE, III, ed. (New Hampshire Univ., Durham), R. A. WHARTON, JR., ed. (New Hampshire Univ., Durham), and R. D. MACELROY, ed. Dec. 1982 90 p refs Meeting held in Durham, N.H., 3-6 May 1981  
(NCC2-27)

(NASA-CP-2247; A-9055; NAS 1.55:2247; CELSS-19) Avail: NTIS HC A05/MF A01 CSCL 06C

CLOSED ECOLOGICAL SYSTEMS, CONFERENCES, GRAINS (FOOD), LIFE SUPPORT SYSTEMS, WASTE TREATMENT

**N84-29465\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PHYSIOLOGICAL, PSYCHOLOGICAL, AND SOCIAL EFFECTS OF NOISE**

K. D. KRYTER (Acousis Co., Bodega Bay, Calif.) Jul. 1984 654 p refs  
(NAS1-15435)

(NASA-RP-1115; L-15612; NAS 1.61:1115) Avail: NTIS HC A99/MF A01 CSCL 20A

The physiological, and behavioral effects of noise on man are investigated. Basic parameters such as definitions of noise, measuring techniques of noise, and the physiology of the ear are presented prior to the development of topics on hearing loss, speech communication in noise, social effects of noise, and the health effects of noise pollution. Recommendations for the assessment and subsequent control of noise is included. For individual titles, see N84-29466 through N84-29477.

**N84-29479\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **HUMAN EXPOSURE IN LOW EARTH ORBIT**

J. W. WILSON and F. CUCINOTTA (Old Dominion Univ.) Aug. 1984 22 p refs

(NASA-TP-2344; L-15803; NAS 1.60:2344) Avail: NTIS HC A02/MF A01 CSCL 06R

HEALTH PHYSICS, HUMAN PERFORMANCE, RADIATION DOSAGE, RADIATION EFFECTS, RADIATION SHIELDING, TOLERANCES (PHYSIOLOGY)

**N85-14487\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **TWENTIETH ANNUAL CONFERENCE ON MANUAL CONTROL, VOLUME 1**

S. G. HART, comp. and E. J. HARTZELL, comp. Sep. 1984 653 p refs Conf. held at Moffett Field, Calif., 12-14 Jun. 1984 2 Vol.

(NASA-CP-2341-VOL-1; A-9879-VOL-1; NAS 1.55:2341-VOL-1) Avail: NTIS HC A99/MF A01 CSCL 05H

BIODYNAMICS, CONFERENCES, HUMAN FACTORS ENGINEERING, MAN MACHINE SYSTEMS, MANUAL CONTROL, PERCEPTION

**N85-14535\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **TWENTIETH ANNUAL CONFERENCE ON MANUAL CONTROL, VOLUME 2**

S. G. HART, comp. and E. J. HARTZELL, comp. Sep. 1984 423 p refs Conf. held at Moffett Field, Calif., 12-14 Jun. 1984 2 Vol.

(NASA-CP-2341-VOL-2; A-9879-VOL-2; NAS 1.55:2341-VOL-2) Avail: NTIS HC A18/MF A01 CSCL 05H

CONFERENCES, FLIGHT CONTROL, HUMAN FACTORS ENGINEERING, MAN MACHINE SYSTEMS, MANUAL CONTROL, PILOT PERFORMANCE, TASKS, WORKLOADS (PSYCHO-PHYSIOLOGY)

**N85-24733\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### **FOOD SERVICE AND NUTRITION FOR THE SPACE STATION**

R. L. SAUER, ed. Apr. 1985 99 p refs Workshop held in Houston, Tex., 10-11 Apr. 1984

(NASA-CP-2370; S-541; NAS 1.55:2370) Avail: NTIS HC A05/MF A01 CSCL 06H

CONSUMABLES (SPACECREW SUPPLIES), FOOD PROCESSING, NUTRITION, SPACE FLIGHT FEEDING

**N85-29531\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM. LIFE SUPPORT SYSTEMS IN SPACE TRAVEL**

R. D. MACELROY, ed., D. T. SMERNOFF, ed. (New Hampshire Univ., Durham), and H. P. KLEIN, ed. (Santa Clara Univ., Calif.) Jun. 1985 74 p refs Proc. of the 25th COSPAR Meeting, held in Graz, Jul. 1984

(NASA-CP-2378; A-85190; NAS 1.55:2378) Avail: NTIS HC A04/MF A01 CSCL 06K

CELLS (BIOLOGY), CLOSED ECOLOGICAL SYSTEMS, CONFERENCES, CONTROLLED ATMOSPHERES, LIFE SUPPORT SYSTEMS

**N85-32772\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **LIVING ALOFT: HUMAN REQUIREMENTS FOR EXTENDED SPACEFLIGHT**

M. M. CONNORS, A. A. HARRISON (California Univ., Davis), and F. R. AKINS (Santa Clara Univ., Calif.) Washington 1985 426 p refs Original contains color illustrations

(NASA-SP-483; NAS 1.21:483) Avail: NTIS HC A19/MF A01; SOD HC \$14.00 as 033-000-00949-6 CSCL 06K

Human psychological and social adjustment to space is investigated. Studies and experiences bearing on human performance capability, psychological well being, and social organization, as they relate to space, were identified and assessed, and suggestions offered as to where further research could ease the Earth/space transition. Special emphasis was given to the variables of crew size, crew diversity, and mission duration, all of which can be expected to increase in future spaceflight. By providing a conceptual framework in which issues and related information can be integrated, the hope is to aid in discovering those conditions under which future space travelers can flourish.

Author

**N86-26836\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **BASILINE EXPERIMENTS IN TELEOPERATOR CONTROL**

W. W. HANKINS, III and R. W. MIXON Jul. 1986 65 p  
(NASA-TP-2547; L-15963; NAS 1.60:2547) Avail: NTIS HC A04/MF A01 CSCL 05H

AUTOMATIC CONTROL, HUMAN FACTORS ENGINEERING, MAN MACHINE SYSTEMS, MANIPULATORS, PROVING, TELEOPERATORS

**N86-32976\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **TWENTY-FIRST ANNUAL CONFERENCE ON MANUAL CONTROL**

R. A. MILLER, comp. (Ohio State Univ., Columbus.) and R. J. JAGACINSKI, comp. May 1986 504 p Conference held in Columbus, Ohio, 17-19 Jun. 1985

(NAG2-195)  
(NASA-CP-2428; A-86218; NAS 1.55:2428) Avail: NTIS HC A22/MF A01 CSCL 05H

DECISION MAKING, HUMAN FACTORS ENGINEERING, HUMAN PERFORMANCE, MAN MACHINE SYSTEMS, MANUAL CONTROL, WORKLOADS (PSYCHOPHYSIOLOGY)

## 55

## SPACE BIOLOGY

Includes exobiology; planetary biology; and extraterrestrial life.

**N77-12718\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**ON THE HABITABILITY OF MARS: AN APPROACH TO PLANETARY ECOSYNTHESIS**

M. M. AVERNER, ed. and R. D. MACELROY, ed. Washington 1976 114 p refs

(NASA-SP-414) Avail: NTIS HC A06/MF A01 CSCL 06F

The possibility of utilizing Mars as a habitat for terrestrial life, including man, is examined. Available data, assumptions, and speculations on the climate, physical state, and chemical inventory of Mars are reviewed and compared with the known requirements and environmental limits of terrestrial life. No fundamental, insuperable limitation of the ability of Mars to support a terrestrial ecology is identified. The lack of an oxygen-containing atmosphere would prevent the unaided habitation of Mars by man. The present strong ultraviolet surface irradiation is an additional major barrier. The creation of an adequate oxygen and ozone-containing atmosphere on Mars may be feasible through the use of photosynthetic organisms. The time needed to generate such an atmosphere, however, might be several millions of years. This period might be drastically reduced by the synthesis of novel, Mars-adapted, oxygen producing photosynthetic strains by techniques of genetic engineering, and modifying the present Martian climate by melting of the Martian polar caps and concomitant advective and greenhouse heating effects. Author

**N78-18771\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI)**

P. MORRISON, ed. (MIT, Cambridge), J. BILLINGHAM, ed., and J. WOLFE, ed. 1977 289 p refs

(NASA-SP-419) Avail: NTIS MF A01; SOD HC \$4.50 CSCL 06C

A bibliography of reports concerning the Search for Extraterrestrial Intelligence is presented. Cosmic evolution, space communication, and technological advances are discussed along with search strategies and search systems. J.C.S.

**N82-20884\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**LIFE IN THE UNIVERSE**

J. BILLINGHAM, ed. Jan. 1982 465 p refs Proc. of conf. held at Moffett Field, Calif., 19-20 Jun. 1979 Analytic primary previously announced in IAA as A82-22976; subsidiaries previously announced as A82-22977 through A82-23004

(NASA-CP-2156; A-8242; NAS 1.55:2156; LC-81-22350) Avail: NTIS MF A01; SOD HC \$8.00 as SN 033-000-0084-4 CSCL 06F

BIOLOGICAL EVOLUTION, CHEMICAL EVOLUTION, EXO BIOLOGY, EXTRATERRESTRIAL LIFE, UNIVERSE

**N84-22178\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SETI SCIENCE WORKING GROUP REPORT**

F. DRAKE (Cornell Univ.), J. H. WOLFE (San Francisco Univ.), and C. L. SEEGER (San Francisco Univ.) Jan. 1984 119 p refs

(NASA-TP-2244; A-9326; NAS 1.60:2244) Avail: NTIS HC A07/MF A01 CSCL 05K

ANTENNAS, BROADBAND, ELECTROMAGNETIC SPECTRA, PROJECT SETI, RADIO ASTRONOMY, SIGNAL PROCESSING, SPECTRUM ANALYSIS

**N85-28562\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**THE COSMIC HISTORY OF THE BIOGENIC ELEMENTS AND COMPOUNDS**

J. A. WOOD (Harvard-Smithsonian Center for Astrophysics) and S. CHANG 1985 87 p

(NASA-SP-476; NAS 1.21:476) Avail: NTIS MF A01; SOD HC \$3.50 as 033-000-00948-8 CSCL 01C

An overview of the cosmic history of biogenic elements is presented. G.L.C.

**N85-32777\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SEARCH FOR THE UNIVERSAL ANCESTORS**

H. HARTMAN, ed. (MIT), J. G. LAWLESS, ed., and P. MORRISON, ed. (MIT) Jul. 1985 145 p refs

(NASA-SP-477; A-8646; NAS 1.21:477) Avail: NTIS MF A01; SOD HC \$3.75 as 033-000-009-3-4 CSCL 06C

By its nature, the study of the origins of life is multidisciplinary, requiring contributions from astronomers, biologists, chemists, geologists, physicists, and many others. Partial answers are provided to many questions about organic chemical evolution and the origin of life. It is observed that the gaps in our knowledge concerning the steps from the nonliving to the living are numerous. Among these gaps are: (1) a solar system formation with its accumulation of raw materials; (2) the synthesis of the life forming monomers, such as the amino acids, nucleotides, and lipids; (3) the condensation of these monomers into useful polymers, such as proteins and nucleic acids; (4) the sequestering of these materials into droplets of proteinoid or membrane-like structures; and (5) the development of a chemical memory (the genetic code) to pass on to the progeny the information acquired. Author

**N86-26844\*#** National Aeronautics and Space Administration, Washington, D.C.

**SECOND SYMPOSIUM ON CHEMICAL EVOLUTION AND THE ORIGIN OF LIFE**

D. L. DEVINCENZI, ed. and P. A. DUFOUR, ed. (George Washington Univ., Washington, D.C.) May 1986 128 p refs Symposium held at Moffett Field, Calif., 23-26 Jul. 1985

(NASW-3165)

(NASA-CP-2425; NAS 1.55:2425) Avail: NTIS HC A07/MF A01 CSCL 06C

BIOLOGICAL EVOLUTION, CHEMICAL EVOLUTION, EXO BIOLOGY, PLANETARY EVOLUTION, PROJECT SETI

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**MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)**

**N77-22808\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SYSTEMS RELIABILITY ISSUES FOR FUTURE AIRCRAFT**

1975 212 p refs Workshop held at Cambridge, Mass., 18-20 Aug. 1975

(Contract NSG-2076)

(NASA-CP-003) Avail: NTIS HC A10/MF A01 CSCL 12B

AIRCRAFT DESIGN, AIRCRAFT RELIABILITY, CONFERENCES, RELIABILITY ENGINEERING, SYSTEMS ENGINEERING

## 59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

**N77-28750\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### PROCEEDINGS OF THE 1977 MACSYMA USERS' CONFERENCE (NASA)

1977 596 p Conf. held at Calif. Univ., Berkeley, 27 - 29 Jul. 1977; sponsored by NASA, MIT and Calif. Univ., Berkeley (NASA-CP-2012) Avail: NTIS HC A25/MF A01 CSCL 09B  
COMPUTER PROGRAMS, CONFERENCES

**N78-19778\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### FUTURE COMPUTER REQUIREMENTS FOR COMPUTATIONAL AERODYNAMICS

Feb. 1978 515 p refs Proceedings held at Moffett Field, Calif., 4-6 Oct. 1977 (NASA-CP-2032; A-7291) Avail: NTIS HC A22/MF A01 CSCL 09B

AERODYNAMICS, COMPUTER SYSTEMS DESIGN, CONFERENCES, NUMERICAL ANALYSIS, NUMERICAL FLOW VISUALIZATION, TECHNOLOGICAL FORECASTING

**N79-33855\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### COMPUTER-AUTOMATED OPPONENT FOR MANNED AIR-TO-AIR COMBAT SIMULATIONS

W. W. HANKINS, III Sep. 1979 153 p refs (NASA-TP-1518; L-12768) Avail: NTIS HC A08/MF A01 CSCL 12B

COMBAT, COMPUTERIZED SIMULATION, FIGHTER AIRCRAFT

**N80-12741\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### VALIDATION METHODS FOR FAULT-TOLERANT AVIONICS AND CONTROL SYSTEMS, WORKING GROUP MEETING 1

Washington Dec. 1979 112 p refs Workshop held at Hampton, Va., 12-14 Mar. 1979 (NASA-CP-2114; L-13436) Avail: NTIS HC A06/MF A01 CSCL 12A

AVIONICS, COMPUTER SYSTEMS DESIGN, FLIGHT CONTROL

**N80-23008\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### VALIDATION METHODS RESEARCH FOR FAULT-TOLERANT AVIONICS AND CONTROL SYSTEMS: WORKING GROUP MEETING, 2

J. W. GAULT, ed., K. S. TRIVEDI, ed., and J. B. CLARY, ed. 1980 105 p Meeting held at Hampton, Va. 3-4 Oct. 1979 (NASA-CP-2130; L-13716) Avail: NTIS HC A06/MF A01 CSCL 12A

AIRBORNE EQUIPMENT, AUTOMATIC CONTROL, COMPUTER SYSTEMS DESIGN, CONTROL UNITS (COMPUTERS), ERROR DETECTION CODES, SYSTEM FAILURES

**N81-12744\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### USER'S MANUAL FOR MMLE3, A GENERAL FORTRAN PROGRAM FOR MAXIMUM LIKELIHOOD PARAMETER ESTIMATION

R. E. MAINE and K. W. ILIFF Nov. 1980 90 p refs (NASA-TP-1563; H-1084) Avail: NTIS HC A05/MF A01 CSCL 09B

COMPUTER PROGRAMS, FLIGHT TESTS, FORTRAN, MAXIMUM LIKELIHOOD ESTIMATES, PARAMETER IDENTIFICATION, USER MANUALS (COMPUTER PROGRAMS)

**N81-15702\*#** Duke Univ., Durham, N. C. Dept. of Computer Sciences.

### VALIDATION METHODS RESEARCH FOR FAULT-TOLERANT AVIONICS AND CONTROL SYSTEMS SUB-WORKING GROUP MEETING. CARE 3 PEER REVIEW

K. S. TRIVEDI, ed. and J. B. CLARY, ed. (Research Triangle Inst., Research Triangle Park, N.C.) Dec. 1980 30 p refs Meeting held at Research Triangle Park, N.C., 15-16 Sep. 1980 (NAG1-70)

(NASA-CP-2167; L-14215) Avail: NTIS HC A03/MF A01 CSCL 12A

AVIONICS, FAULT TOLERANCE, FLIGHT CONTROL, RELIABILITY ANALYSIS

**N81-21775\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### MARKING PARTS TO AID ROBOT VISION

J. W. BALES (Tuskegee Inst., Ala.) and L. K. BARKER Apr. 1981 36 p (NASA-TP-1819; L-14055) Avail: NTIS HC A03/MF A01 CSCL 12A

ARTIFICIAL INTELLIGENCE, AUTOMATA THEORY, MARKING, PATTERN RECOGNITION, ROBOTS

**N81-27813\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### PROGRAMMER'S MANUAL FOR MMLE3, A GENERAL FORTRAN PROGRAM FOR MAXIMUM LIKELIHOOD PARAMETER ESTIMATION

R. E. MAINE Jun. 1981 118 p refs Document includes a microfiche supplement (NASA-TP-1690; H-1105) Avail: NTIS HC A06/MF A01 CSCL 09B

COMPUTER PROGRAMS, FLOW CHARTS, FORTRAN, MANUALS, MAXIMUM LIKELIHOOD ESTIMATES

**N82-21907\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

### A GENERAL SOLUTION TO THE HIDDEN-LINE PROBLEM

D. R. HEDGLEY, JR. Mar. 1982 17 p refs (NASA-RP-1085; H-1162; NAS 1.61:1085) Avail: NTIS HC A02/MF A01 CSCL 12A

The requirements for computer-generated perspective projections of three dimensional objects has escalated. A general solution was developed. The theoretical solution to this problem is presented. The method is very efficient as it minimizes the selection of points and comparison of line segments and hence avoids the devastation of square-law growth. Author

**N82-26996\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### COMPUTER SCIENCE RESEARCH AT LANGLEY

S. J. VOIGT, ed. Jun. 1982 68 p Workshop held at Hampton, Va., 2-5 Nov. 1981 (NASA-CP-2236; NAS 1.55:2236; L-15418) Avail: NTIS HC A04/MF A01 CSCL 09B

COMPUTER GRAPHICS, COMPUTER TECHNIQUES, CONFERENCES, RESEARCH, USER REQUIREMENTS

**N82-29904\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### GLOBAL DIFFERENTIAL GEOMETRY: AN INTRODUCTION FOR CONTROL ENGINEERS

B. F. DOOLIN (Computer Services Corp.) and C. F. MARTIN (Case Western Reserve Univ.) Jun. 1982 69 p refs (NASA-RP-1091; NAS 1.61:1091) Avail: NTIS HC A04/MF A01 CSCL 12A

The basic concepts and terminology of modern global differential geometry are discussed as an introduction to the Lie theory of differential equations and to the role of Grassmannians in control systems analysis. To reach these topics, the fundamental notions of manifolds, tangent spaces, vector fields, and Lie algebras are discussed and exemplified. An appendix reviews such concepts

## COMPUTER OPERATIONS AND HARDWARE

needed for vector calculus as open and closed sets, compactness, continuity, and derivative. Although the content is mathematical, this is not a mathematical treatise but rather a text for engineers to understand geometric and nonlinear control. J.M.S.

**N84-22179\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPUTER-AIDED GEOMETRY MODELING**

J. N. SHOOSMITH, comp. and R. E. FULTON, comp. Washington Mar. 1984 387 p refs Symp. held in Hampton, Va., 20-22 Apr. 1983

(NASA-CP-2272; L-15618; NAS 1.55:2272) Avail: NTIS HC

A17/MF A01 CSDL 12A

COMPUTER AIDED DESIGN, COMPUTER GRAPHICS, CONFERENCES, COORDINATES, GEOMETRY, MATHEMATICAL MODELS, SHAPES, SURFACES

**N84-24114\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**GEOMETRIC INTERPRETATIONS OF THE DISCRETE FOURIER TRANSFORM (DFT)**

C. W. CAMPBELL May 1984 16 p refs

(NASA-TP-2332; NAS 1.60:2332) Avail: NTIS HC A02/MF A01 CSDL 12A

DIGITAL TECHNIQUES, FAST FOURIER TRANSFORMATIONS, INTEGRAL TRANSFORMATIONS, POWER SPECTRA, TRANSFORMATIONS (MATHEMATICS)

**N85-23305\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**AN INTEGRAL REPRESENTATION OF THE GENERALIZED EULER-MASCHERONI CONSTANTS**

O. R. AINSWORTH (Alabama Univ., Tuscaloosa) and L. W. HOWELL Apr. 1985 14 p refs

(NASA-TP-2456; NAS 1.60:2456) Avail: NTIS HC A02/MF A01 CSDL 12A

CONSTANTS, INTEGRALS, SERIES (MATHEMATICS)

**N85-28563\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COMPUTATIONAL GEOMETRY AND COMPUTER-AIDED DESIGN Extended Abstracts**

T. H. FAY, comp. (Univ. of Southern Mississippi, Hattiesburg) and J. N. SHOOSMITH, comp. Washington Jun. 1985 117 p refs Conf. held in New Orleans, 5-8 Jun. 1985; sponsored in cooperation with Univ. of Southern Mississippi

(NASA-CP-2379; L-16003; NAS 1.55:2379) Avail: NTIS HC A06/MF A01 CSDL 12A

COMPUTATIONAL GRIDS, COMPUTER AIDED DESIGN, GEOMETRY

**N85-31839\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTERSECTION OF THREE-DIMENSIONAL GEOMETRIC SURFACES**

V. K. CRISP, J. J. REHDER, and J. L. SCHWING (Old Dominion Univ.) Jul. 1985 33 p refs

(NASA-TP-2454; L-15911; NAS 1.60:2454) Avail: NTIS HC A03/MF A01 CSDL 12A

COMPUTER AIDED DESIGN, COMPUTER GRAPHICS, DRAWINGS, INTERSECTIONS

**N86-23282\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTERACTIVE ALGEBRAIC GRID-GENERATION TECHNIQUE**

R. E. SMITH and M. R. WIESE (Computer Sciences Corp., Hampton, Va.) Mar. 1986 40 p refs

(NASA-TP-2533; L-16019; NAS 1.60:2533) Avail: NTIS HC A03/MF A01 CSDL 12A

COMPUTATIONAL FLUID DYNAMICS, COMPUTER GRAPHICS, FINITE DIFFERENCE THEORY, PROBLEM SOLVING

Includes hardware for computer graphics, firmware, and data processing.

**N77-33868\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**FAULT TOLERANT COMPUTING: A PREAMBLE FOR ASSURING VIABILITY OF LARGE COMPUTER SYSTEMS**

R. S. LIM Oct. 1977 25 p refs

(NASA-TP-1067; A-7072) Avail: NTIS HC A02/MF A01 CSDL 09B

COMPUTER NETWORKS, ERROR CORRECTING CODES, ERROR DETECTION CODES

**N78-74659\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THE MSFC/UAH DATA MANAGEMENT SYMPOSIUM**

A. CASTELLI, ed. 16 Feb. 1978 423 p refs Symp. held at Huntsville, Ala., 18-19 Oct. 1977

(NASA-CP-2040)

ALABAMA, CONFERENCES, DATA MANAGEMENT, NASA PROGRAMS, UNIVERSITIES

**N79-30947\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**CONCURRENT ERROR DETECTING CODES FOR ARITHMETIC PROCESSORS**

R. S. LIM Aug. 1979 27 p refs

(NASA-TP-1528; A-7810) Avail: NTIS HC A03/MF A01 CSDL 09B

ARITHMETIC, ERROR DETECTION CODES

**N79-33858\*#** National Aeronautics and Space Administration. Earth Resources Lab., Bay St. Louis, Miss.

**PROCEDURE FOR EXTRACTION OF DISPARATE DATA FROM MAPS INTO COMPUTERIZED DATA BASES**

B. G. JUNKIN Washington Oct. 1979 23 p refs

(NASA-RP-1048) Avail: NTIS HC A02/MF A01 CSDL 09B

A procedure is presented for extracting disparate sources of data from geographic maps and for the conversion of these data into a suitable format for processing on a computer-oriented information system. Several graphic digitizing considerations are included and related to the NASA Earth Resources Laboratory's Digitizer System. Current operating procedures for the Digitizer System are given in a simplified and logical manner. The report serves as a guide to those organizations interested in converting map-based data by using a comparable map digitizing system.

Author

**N80-16742\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INFORM: AN INTERACTIVE DATA COLLECTION AND DISPLAY PROGRAM WITH DEBUGGING CAPABILITY**

D. S. Cwynar Jan. 1980 169 p refs

(NASA-TP-1424; E-9810) Avail: NTIS HC A08/MF A01 CSDL 09B

COMPUTER GRAPHICS, COMPUTER SYSTEMS PROGRAMS, LANGUAGE PROGRAMMING

**N81-11644\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**AEROSPACE APPLICATIONS OF MICROPROCESSORS**

1980 269 p refs Workshop held in Greenbelt, Md., 3-4 Nov. 1980; sponsored by NASA. Goddard Space Flight Center and AIAA

(NASA-CP-2158) Avail: NTIS HC A12/MF A01 CSDL 09B

AEROSPACE ENGINEERING, COMPUTER PROGRAMS, MICROPROCESSORS, MICROPROGRAMMING, SPACECRAFT INSTRUMENTS, TECHNOLOGY ASSESSMENT

## 60 COMPUTER OPERATIONS AND HARDWARE

**N81-25690\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **A DESIGN APPROACH TO REAL-TIME FORMATTING OF HIGH SPEED MULTISPECTRAL IMAGE DATA**

B. D. MEREDITH and W. L. KELLY, IV May 1981 20 p refs (NASA-TP-1870; L-14454) Avail: NTIS HC A02/MF A01 CSCL 09B

BUFFER STORAGE, IMAGE PROCESSING, MICROPROCESSORS, ONBOARD DATA PROCESSING, REAL TIME OPERATION

**N82-11784\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. Data Systems Lab.

### **SPACE SHUTTLE MAIN ENGINE CONTROLLER**

R. M. MATTOX and J. B. WHITE Nov. 1981 40 p refs (NASA-TP-1932; M-360) Avail: NTIS HC A03/MF A01 CSCL 09B

ENGINE CONTROL, MECHANICAL ENGINEERING, SPACE SHUTTLE MAIN ENGINE, SYSTEMS ENGINEERING

## 61

## COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms, and specific applications, e.g., CAD/CAM.

**N77-33876\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STANDARDIZATION, CERTIFICATION, MAINTENANCE, AND DISSEMINATION OF LARGE SCALE ENGINEERING SOFTWARE SYSTEMS**

T. G. TORIDIS, ed. (George Washington Univ., Washington, D.C.), H. G. MCCOMB, JR., ed., and K. KHOZEIMEH, ed. (George Washington Univ., Washington, D.C.) Sep. 1977 103 p refs Panel Discussion Held at Washington, D.C., 29-31 Mar. 1976; sponsored by NASA and NSF (NASA-CP-2015; L-11771) Avail: NTIS HC A06/MF A01 CSCL 09B

COMPUTER PROGRAMS, CONFERENCES, MAINTENANCE, STANDARDIZATION, STRUCTURAL ANALYSIS

**N78-10746\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **USER'S GUIDE FOR SFTRAN/360**

T. E. FESSLER and W. F. FORD Oct. 1977 51 p refs (NASA-TP-1006; E-9264) Avail: NTIS HC A04/MF A01 CSCL 09B

PROGRAMMING LANGUAGES, USER MANUALS (COMPUTER PROGRAMS)

**N78-20806\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **USER'S GUIDE TO SFTRAN/1100**

W. F. FORD and T. E. FESSLER Apr. 1978 44 p refs (NASA-TP-1200; E-9445) Avail: NTIS HC A03/MF A01 CSCL 09B

FORTRAN, UNIVAC 1100 SERIES COMPUTERS, USER MANUALS (COMPUTER PROGRAMS)

**N78-33776\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **ENGINEERING AND SCIENTIFIC DATA MANAGEMENT**

1978 255 p refs Proc. of Conf. held at Hampton, Va., 18-19 May 1978 Sponsored in part by the Inst. for Computer Appl. in Sci. and Eng., and the George Washington Univ. Joint Inst. for Advan. of Flight Sci., Hampton, Va. (NASA-CP-2055; L-12043) Avail: NTIS HC A12/MF A01 CSCL 09B

COMPUTER TECHNIQUES, CONFERENCES, DATA BASES, DATA MANAGEMENT, SCIENCE, SYSTEMS ENGINEERING

**N78-33791\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **GUIDE TO A CONDENSED FORM OF NASTRAN**

J. L. ROGERS, JR. Sep. 1978 297 p refs (NASA-RP-1019; L-11900) Avail: NTIS HC A13/MF A01 CSCL 09B

A limited capability form of NASTRAN level 16 is presented to meet the needs of universities and small consulting firms. The input cards, the programming language of the direct matrix abstraction program, the plotting, the problem definition, and the modules' diagnostic messages are described. Sample problems relating to the analysis of linear static, vibration, and buckling are included. This guide can serve as a handbook for instructional courses in the use of NASTRAN or for users who need only the capability provided by the condensed form. A.R.H.

**N79-13736\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **TOOLS FOR EMBEDDED COMPUTING SYSTEMS SOFTWARE**

1978 137 p refs Workshop held at Hampton, Va., 7-8 Nov. 1978; sponsored in part by AIAA (NASA-CP-2064; L-12640) Avail: NTIS HC A07/MF A01 CSCL 09B

COMPUTER PROGRAMS, COMPUTER SYSTEMS PROGRAMS, PROGRAMMING LANGUAGES, TOOLS

**N79-17580\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **AN INTEGRATED COMPUTER PROCEDURE FOR SIZING COMPOSITE AIRFRAME STRUCTURES**

J. SOBIESZCZANSKI-SOBIESKI Feb. 1979 45 p refs (NASA-TP-1300; L-11817) Avail: NTIS HC A03/MF A01 CSCL 09B

AIRFRAME MATERIALS, COMPOSITE MATERIALS, COMPUTER PROGRAMS, OPTIMIZATION

**N79-21798\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **INTERACTIVE DEBUG PROGRAM FOR EVALUATION AND MODIFICATION OF ASSEMBLY-LANGUAGE SOFTWARE**

D. J. ARPASI Apr. 1979 82 p refs (NASA-TP-1441; E-9219) Avail: NTIS HC A05/MF A01 CSCL 09B

ASSEMBLY LANGUAGE, COMPUTER PROGRAMS, HONEYWELL COMPUTERS

**N79-23688\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **WETAIR: A COMPUTER CODE FOR CALCULATING THERMODYNAMIC AND TRANSPORT PROPERTIES OF AIR-WATER MIXTURES**

T. E. FESSLER May 1979 16 p refs (NASA-TP-1466; E-9801) Avail: NTIS HC A02/MF A01 CSCL 09B

AIR WATER INTERACTIONS, COMPUTER PROGRAMS, LIQUID-GAS MIXTURES, THERMODYNAMIC PROPERTIES, TRANSPORT PROPERTIES

## 61 COMPUTER PROGRAMMING AND SOFTWARE

**N81-12760\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **THE PR2D (PLACE, ROUTE IN 2-DIMENSIONS) AUTOMATIC LAYOUT COMPUTER PROGRAM HANDBOOK**

T. M. EDGE Sep. 1978 256 p refs  
(NASA-RP-1029; M-268) Avail: NTIS HC A12/MF A01 CSCL 09B

Place, Route in 2-Dimensions is a standard cell automatic layout computer program for generating large scale integrated/metal oxide semiconductor arrays. The program was utilized successfully for a number of years in both government and private sectors but until now was undocumented. The compilation, loading, and execution of the program on a Sigma V CP-V operating system is described. S.F.

**N81-33838\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **COMPUTER PROGRAM FOR PULSED THERMOCOUPLES WITH CORRECTIONS FOR RADIATION EFFECTS**

H. A. WILL Sep. 1981 42 p refs  
(NASA-TP-1895; E-615) Avail: NTIS HC A03/MF A01 CSCL 09B

COMPUTER PROGRAMS, RADIATION DAMAGE, THERMOCOUPLES

**N82-24845\*#** Research Triangle Inst., Research Triangle Park, N.C. Systems and Measurements Div.

### **PRODUCTION OF RELIABLE FLIGHT CRUCIAL SOFTWARE: VALIDATION METHODS RESEARCH FOR FAULT TOLERANT AVIONICS AND CONTROL SYSTEMS SUB-WORKING GROUP MEETING**

J. R. DUNHAM, ed. and J. C. KNIGHT, ed. (Virginia Univ.) May 1982 27 p refs Meeting held at Research Triangle Park, N.C., 2-4 Nov. 1981  
(NASA-CP-2222; L-15291; NAS 1.55:2222) Avail: NTIS HC A03/MF A01 CSCL 09B

AUTOMATIC FLIGHT CONTROL, AVIONICS, COMPUTER SYSTEMS PERFORMANCE, CONFERENCES, FAULT TOLERANCE, PROGRAM VERIFICATION (COMPUTERS), RELIABILITY ENGINEERING

**N82-33020\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **AUTOMATED PROCEDURE FOR DEVELOPING HYBRID COMPUTER SIMULATIONS OF TURBOFAN ENGINES. PART 1: GENERAL DESCRIPTION**

J. R. SZUCH, S. M. KROSEL, and W. M. BRUTON Aug. 1982 120 p refs  
(NASA-TP-1851; E-779; NAS 1.60:1851) Avail: NTIS HC A06/MF A01 CSCL 09B

COMPUTER AIDED DESIGN, COMPUTER PROGRAMS, COMPUTERIZED SIMULATION, ENGINE DESIGN, TURBOFAN ENGINES

**N83-17115\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **IPAD: INTEGRATED PROGRAMS FOR AEROSPACE-VEHICLE DESIGN**

Sep. 1980 398 p refs Proc. of Symp. held in Denver, 17-19 Sep. 1980 Sponsored in cooperation with Industry Technical Advisory Board  
(NASA-CP-2143; L-13916; NAS 1.55:2143) Avail: NTIS HC A17/MF A01 CSCL 09B

AEROSPACE VEHICLES, COMPUTER AIDED DESIGN, COMPUTER AIDED MANUFACTURING, COMPUTER PROGRAMS, PRODUCTION MANAGEMENT, PROJECT MANAGEMENT, SPACECRAFT DESIGN

**N84-20208\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **CYBER 200 APPLICATIONS SEMINAR**

J. P. GARY, comp. Mar. 1984 342 p refs Seminar held in Lanham, Md., 10-12 Oct. 1983; sponsored in cooperation with Control Data Corp.

(NASA-CP-2295; NAS 1.55:2295; REPT-84F5215) Avail: NTIS HC A15/MF A01 CSCL 09B

COMPUTER PROGRAMMING, COMPUTERIZED SIMULATION, CONFERENCES, DIGITAL COMPUTERS

**N84-27461\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **STABCAR: A PROGRAM FOR FINDING CHARACTERISTIC ROOT SYSTEMS HAVING TRANSCENDENTAL STABILITY MATRICES**

W. M. ADAMS, JR., S. H. TIFFANY, J. R. NEWSOM, and E. L. PEELE Jun. 1984 144 p refs  
(NASA-TP-2165; L-14861; NAS 1.60:2165) Avail: NTIS HC A07/MF A01 CSCL 09B

AERODYNAMIC CHARACTERISTICS, AIRCRAFT, COMPUTER PROGRAMS, FLUTTER, MATRICES (MATHEMATICS), STABILITY

**N85-17576\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **MINDS: A MICROCOMPUTER INTERACTIVE DATA SYSTEM FOR 8086-BASED CONTROLLERS**

J. F. SOEDER Jan. 1985 41 p refs  
(NASA-TP-2378; E-2172; NAS 1.60:2378) Avail: NTIS HC A03/MF A01 CSCL 09B

COMPUTER SYSTEMS PROGRAMS, INTERACTIVE CONTROL, MICROCOMPUTERS

**N85-20689\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SPACE STATION SOFTWARE ISSUES**

S. VOIGT, ed. and S. BESKENIS, ed. (Kentron International, Inc., Hampton, Va.) Washington Feb. 1985 68 p refs Workshop held in Hampton, Va., 20-21 Aug. 1984

(NASA-CP-2361; L-15945; NAS 1.55:2361) Avail: NTIS HC A04/MF A01 CSCL 09B

COMPUTER PROGRAMMING, CONFIGURATION MANAGEMENT, ORBITAL SPACE STATIONS, PROJECT MANAGEMENT, SOFTWARE ENGINEERING

**N85-28609\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **PEER REVIEW OF A FORMAL VERIFICATION/DESIGN PROOF METHODOLOGY Summary Report**

1983 56 p refs Meeting held in Atlanta, 7-8 Jul. 1983 Prepared in cooperation with Research Triangle Inst.

(NASA-CP-2377; L-15992; NAS 1.55:2377) Avail: NTIS HC A04/MF A01 CSCL 09B

CONFERENCES, DESIGN ANALYSIS, PROVING, SOFTWARE ENGINEERING

**N85-28610\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **REAL-TIME MULTIPROCESSOR PROGRAMMING LANGUAGE (RTMPL) USER'S MANUAL**

D. J. ARPASI Jun. 1985 115 p refs  
(NASA-TP-2422; E-1999; NAS 1.60:2422) Avail: NTIS HC A06/MF A01 CSCL 09B

DISTRIBUTED PROCESSING, MULTIPROCESSING (COMPUTERS), REAL TIME OPERATION, USER MANUALS (COMPUTER PROGRAMS)

## 61 COMPUTER PROGRAMMING AND SOFTWARE

**N86-23314\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **SPACE STATION SOFTWARE RECOMMENDATIONS**

S. VOIGT, ed. Dec. 1985 142 p refs Forum held in Huntsville, Ala., 24-25 Apr. 1985  
(NASA-CP-2394; L-16063; NAS 1.55:2394) Avail: NTIS HC A07/MF A01 CSCL 09B

COMPUTER PROGRAMS, PROJECT MANAGEMENT, SOFTWARE ENGINEERING, SPACE STATIONS

**N84-22299\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **IPAD 2: ADVANCES IN DISTRIBUTED DATA BASE MANAGEMENT FOR CAD/CAM**

S. W. BOSTIC, comp. Washington Apr. 1984 258 p refs Symp. held in Denver, 17-19 Apr. 1984; sponsored by NASA, Naval Material Command and the Industrial Technical Advisory Board

(NASA-CP-2301; L-15765; NAS 1.55:2301) Avail: NTIS HC A12/MF A01 CSCL 09B

COMPUTER AIDED DESIGN, COMPUTER AIDED MANUFACTURING, CONFERENCES, DATA BASE MANAGEMENT SYSTEMS, SYSTEMS INTEGRATION

## 62

### COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

**N78-30862\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **A DECODING PROCEDURE FOR THE REED-SOLOMON CODES**

R. S. LIM Aug. 1978 25 p refs  
(NASA-TP-1286; A-7372) Avail: NTIS HC A02/MF A01 CSCL 09B

DECODING, ERROR CORRECTING CODES, MAGNETIC STORAGE

**N79-21822\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### **NASF TRANSDUCTION NETWORK: A COMPUTING NETWORK FOR UNSCRAMBLING P-ORDERED VECTORS**

R. S. LIM Apr. 1979 37 p refs  
(NASA-TP-1426; A-7645) Avail: NTIS HC A03/MF A01 CSCL 09B

COMPUTER NETWORKS, NASA PROGRAMS, RANDOM ACCESS MEMORY, VECTORS (MATHEMATICS)

**N82-14829\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **RUGGEDIZED MINICOMPUTER HARDWARE AND SOFTWARE TOPICS, 1981: PROCEEDINGS OF THE 4TH ROLM MIL-SPEC COMPUTER USER'S GROUP CONFERENCE**

Dec. 1981 214 p refs Conf. held in San Diego, Calif., 22-25 Feb. 1981  
(NASA-CP-2206; L-14886) Avail: NTIS HC A11/MF A01 CSCL 09B

AIRBORNE/SPACEBORNE COMPUTERS, COMMERCIAL AIRCRAFT, COMPUTER STORAGE DEVICES, CONFERENCES, DISPLAY DEVICES, FLIGHT TESTS, MICROPROCESSORS, ONBOARD DATA PROCESSING, TECHNOLOGY UTILIZATION, USER REQUIREMENTS

**N83-28921\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **PARALLEL, ASYNCHRONOUS EXECUTIVE (PAX): SYSTEM CONCEPTS, FACILITIES, AND ARCHITECTURE**

W. H. JONES Jun. 1983 60 p refs  
(NASA-TP-2179; E-1584; NAS 1.60:2179) Avail: NTIS HC A04/MF A01 CSCL 09B

ARCHITECTURE (COMPUTERS), DISTRIBUTED PROCESSING, PARALLEL PROCESSING (COMPUTERS)

**N84-34198\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **VALIDATION OF A FAULT-TOLERANT CLOCK SYNCHRONIZATION SYSTEM**

R. W. BUTLER and S. C. JOHNSON Sep. 1984 23 p refs  
(NASA-TP-2346; L-15799; NAS 1.60:2346) Avail: NTIS HC A02/MF A01 CSCL 09B

CLOCKS, COMPUTER SYSTEMS PERFORMANCE, FAULT TOLERANCE, PROVING, RELIABILITY, SYNCHRONISM

**N85-17596\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### **OPERATING SYSTEM FOR A REAL-TIME MULTIPROCESSOR PROPULSION SYSTEM SIMULATOR. USER'S MANUAL**

G. L. COLE Jan. 1985 42 p refs  
(NASA-TP-2426; D-1998; NAS 1.60:2426) Avail: NTIS HC A03/MF A01 CSCL 09B

MULTIPROCESSING (COMPUTERS), REAL TIME OPERATION, SIMULATORS, USER MANUALS (COMPUTER PROGRAMS)

**N86-27947\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **HYBRID ROUTING TECHNIQUE FOR A FAULT-TOLERANT, INTEGRATED INFORMATION NETWORK**

B. D. MEREDITH Jul. 1986 20 p  
(NASA-TP-2605; L-16034; NAS 1.60:2605) Avail: NTIS HC A02/MF A01 CSCL 09B

ALGORITHMS, COMMUNICATION NETWORKS, FAULT TOLERANCE, INFORMATION SYSTEMS, REAL TIME OPERATION, SPACE STATIONS, SPACECRAFT COMMUNICATION, SPACECREWS, TOPOLOGY

## 63

### CYBERNETICS

Includes feedback and control theory, artificial intelligence, robotics and expert systems.

**N78-18823\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### **EIGENVALUE/EIGENVECTOR ASSIGNMENT USING OUTPUT FEEDBACK**

S. SRINATHKUMAR Feb. 1978 32 p refs  
(NASA-TP-1118; L-11869) Avail: NTIS HC A03/MF A01 CSCL 09B

EIGENVALUES, EIGENVECTORS, FEEDBACK CONTROL



**N78-22809\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ORACLS: A SYSTEM FOR LINEAR-QUADRATIC-GAUSSIAN CONTROL LAW DESIGN**

E. S. ARMSTRONG Apr. 1978 198 p refs  
(NASA-TP-1106; L-11769) Avail: NTIS HC A09/MF A01  
CSCL 09B

COMPUTER PROGRAMS, CONTROL THEORY, LINEAR SYSTEMS, OPTIMAL CONTROL, QUADRATIC EQUATIONS

**N80-25039\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**REALIZABLE OPTIMAL CONTROL FOR A REMOTELY PILOTED RESEARCH VEHICLE**

H. J. DUNN May 1980 35 p refs  
(NASA-TP-1654; L-13403) Avail: NTIS HC A03/MF A01  
CSCL 01C

CONTROL THEORY, CONTROLLERS, OPTIMAL CONTROL, REMOTELY PILOTED VEHICLES, STABILITY AUGMENTATION

**N81-29840\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN APPLICATION OF MULTIVARIABLE DESIGN TECHNIQUES TO THE CONTROL OF THE NATIONAL TRANSONIC FACILITY**

E. S. ARMSTRONG and J. S. TRIPP Aug. 1981 34 p refs  
(NASA-TP-1887; L-14491) Avail: NTIS HC A03/MF A01  
CSCL 14B

CONTROL SIMULATION, CRYOGENIC WIND TUNNELS, DIGITAL TECHNIQUES, FEEDBACK CONTROL, OPTIMAL CONTROL, TRANSONIC WIND TUNNELS

**N81-30851\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A METHOD FOR OBTAINING REDUCED-ORDER CONTROL LAWS FOR HIGH-ORDER SYSTEMS USING OPTIMIZATION TECHNIQUES**

V. MUKHOPADHYAY, J. R. NEWSOM, and I. ABEL Aug. 1981 66 p refs  
(NASA-TP-1876; L-14355) Avail: NTIS HC A04/MF A01  
CSCL 12A

CONTROL THEORY, FEEDBACK CONTROL, NONLINEAR PROGRAMMING, OPTIMIZATION

**N84-16843\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**AESOP: AN INTERACTIVE COMPUTER PROGRAM FOR THE DESIGN OF LINEAR QUADRATIC REGULATORS AND KALMAN FILTERS**

B. LEHTINEN and L. C. GEYSER Jan. 1984 115 p refs  
(NASA-TP-2221; E-1686; NAS 1.60:2221) Avail: NTIS HC A06/MF A01 CSCL 09B

COMPUTER AIDED DESIGN, INTERACTIVE CONTROL, KALMAN FILTERS, REGULATORS

**N84-28538\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**REGIONS OF ATTRACTION AND ULTIMATE BOUNDEDNESS FOR LINEAR QUADRATIC REGULATORS WITH NONLINEARITIES**

S. M. JOSHI Jul. 1984 34 p refs  
(NASA-TP-2322; L-15739; NAS 1.60:2322) Avail: NTIS HC A03/MF A01 CSCL 09C

ATTITUDE CONTROL, ATTRACTION, CONTROLLERS, FEEDBACK CONTROL, LARGE SPACE STRUCTURES, NONLINEAR FEEDBACK, NONLINEAR SYSTEMS, OPTIMAL CONTROL, VIBRATION DAMPING

**N84-28539\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**KINEMATIC CONTROL OF ROBOT WITH DEGENERATE WRIST**

L. K. BARKER and M. C. MOORE Jul. 1984 37 p refs  
(NASA-TP-2341; L-15743; NAS 1.60:2341) Avail: NTIS HC A03/MF A01 CSCL 09B

ARTIFICIAL INTELLIGENCE, DYNAMIC CHARACTERISTICS, DYNAMIC CONTROL, KINEMATIC EQUATIONS, ROBOTICS, WRIST

**N85-15446\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TRANSLATIONAL CONTROL OF A GRAPHICALLY SIMULATED ROBOT ARM BY KINEMATIC RATE EQUATIONS THAT OVERCOME ELBOW JOINT SINGULARITY**

L. K. BARKER, J. A. HOUCK, and S. W. CARZOO (Sperry Corp., Hampton, Va.) Dec. 1984 44 p refs  
(NASA-TP-2376; L-15828; NAS 1.60:2376) Avail: NTIS HC A03/MF A01 CSCL 05H

COMPUTERIZED SIMULATION, JOINTS (JUNCTIONS), KINEMATIC EQUATIONS, MANEUVERS, MANIPULATORS, ROBOTS, SINGULARITY (MATHEMATICS), TELEOPERATORS, TRANSLATIONAL MOTION

**N85-27575\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**KINEMATIC RATE CONTROL OF SIMULATED ROBOT HAND AT OR NEAR WRIST SINGULARITY**

K. BARKER, J. A. HOUCK, and S. W. CARZOO (Sperry Corp., Hampton, Va.) May 1985 28 p refs  
(NASA-TP-2440; L-15889; NAS 1.60:2440) Avail: NTIS HC A03/MF A01 CSCL 09B

COMPUTERIZED SIMULATION, KINEMATIC EQUATIONS, MANIPULATORS, ROBOTS, WRIST

**N86-13946\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A METHOD TO STABILIZE LINEAR SYSTEMS USING EIGENVALUE GRADIENT INFORMATION**

C. D. WIESEMAN Nov. 1985 40 p refs  
(NASA-TP-2479; L-15964; NAS 1.60:2479) Avail: NTIS HC A03/MF A01 CSCL 09B

CONTROL STABILITY, EIGENVALUES, LINEAR SYSTEMS, OPTIMIZATION, SYSTEMS STABILITY

**N86-25168\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORETICAL THREE-AND FOUR-AXIS GIMBAL ROBOT WRISTS**

L. K. BARKER and J. A. HOUCK May 1986 38 p refs  
(NASA-TP-2564; L-16042; NAS 1.60:2564) Avail: NTIS HC A03/MF A01 CSCL 09B

FLIGHT SIMULATION, GIMBALS, HAND (ANATOMY), MANIPULATORS, REMOTE HANDLING, ROBOTS, WRIST

## NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

**N78-31836\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN ALTERNATING DIRECTION IMPLICIT METHOD FOR THE CONTROL DATA STAR-100 VECTOR COMPUTER**

J. J. LAMBIOTTE, JR. Sep. 1978 25 p refs  
(NASA-TP-1282; L-12287) Avail: NTIS HC A02/MF A01  
CSCL 12A

ALGORITHMS, ALTERNATING DIRECTION IMPLICIT METHODS, CONTROL DATA (COMPUTERS)

**N80-13839\*#** National Aeronautics and Space Administration, Washington, D.C.

**MATHEMATICAL MODELING OF DIVERSE PHENOMENA**

J. C. HOWARD 1979 402 p refs  
(NASA-SP-437; LC-79-18506) Avail: NTIS HC A18/MF A01  
CSCL 12A

Tensor calculus is applied to the formulation of mathematical models of diverse phenomena. Aeronautics, fluid dynamics, and cosmology are among the areas of application. The feasibility of combining tensor methods and computer capability to formulate problems is demonstrated. The techniques described are an attempt to simplify the formulation of mathematical models by reducing the modeling process to a series of routine operations, which can be performed either manually or by computer. J.M.S.

**N81-14690\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NUMERICAL GRID GENERATION TECHNIQUES**

1980 561 p refs Conf. held at NASA Langley Research Center, Hampton, Va., 6-7 Oct. 1980 Sponsored in part by Institute for Computer Applications in Science and Engineering, Hampton, Va.

(NASA-CP-2166) Avail: NTIS HC A24/MF A01 CSCL 12A  
BOUNDARY VALUE PROBLEMS, CONFERENCES, CONFORMAL MAPPING, COORDINATE TRANSFORMATIONS, FINITE DIFFERENCE THEORY, FLUID FLOW, MESH, PARTIAL DIFFERENTIAL EQUATIONS, PROBLEM SOLVING, TOPOLOGY

**N81-22754\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TEMPORAL AND SPATIAL INCONSISTENCIES OF TIME-SPLIT FINITE-DIFFERENCE SCHEMES**

D. L. DWOYER and F. C. THAMES Apr. 1981 58 p refs  
(NASA-TP-1790; L-13941) Avail: NTIS HC A04/MF A01  
CSCL 12A

ALGORITHMS, CONSISTENCY, FINITE DIFFERENCE THEORY, FLOW EQUATIONS, TIME

**N81-33856\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**NUMERICAL BOUNDARY CONDITION PROCEDURES**

Oct. 1981 383 p refs Symp. held at Moffett Field, Calif., 19-20 Oct. 1981  
(NASA-CP-2201; A-8736) Avail: NTIS HC A17/MF A01

BOUNDARY VALUE PROBLEMS, COMPUTATIONAL FLUID DYNAMICS, CONDITIONS, CONFERENCES, GAS DYNAMICS, NUMERICAL FLOW VISUALIZATION

**N81-33879\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**MULTIGRID METHODS**

Oct. 1981 304 p refs Symp. held at Moffett Field, Calif., 21-22 Oct. 1981  
(NASA-CP-2202; A-8738) Avail: NTIS HC A14/MF A01 CSCL 12A

CONFERENCES, MATRICES (MATHEMATICS), NAVIER-STOKES EQUATION, NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS

**N83-25438\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THEORETICAL METHOD FOR CALCULATING RELATIVE JOINT GEOMETRY OF ASSEMBLED ROBOT ARMS**

L. K. BARKER and M. C. MOORE May 1983 25 p refs  
(NASA-TP-2155; L-15562; NAS 1.60:2155) Avail: NTIS HC A02/MF A01 CSCL 12A

EQUATIONS OF MOTION, GEOMETRY, MATHEMATICAL MODELS, REMOTE HANDLING, ROBOTS

**N83-34661\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VECTOR-ALGEBRA APPROACH TO EXTRACT DENAVIT-HARTENBERG PARAMETERS OF ASSEMBLED ROBOT ARMS**

L. K. BARKER Aug. 1983 34 p refs  
(NASA-TP-2191; L-15621; NAS 1.60:2191) Avail: NTIS HC A03/MF A01 CSCL 12A

ARM (ANATOMY), MATRICES (MATHEMATICS), ROBOTS, TRANSFORMATIONS (MATHEMATICS), VECTORS (MATHEMATICS)

**N84-13885\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ACCELERATION OF CONVERGENCE OF VECTOR SEQUENCES**

A. SIDDI, W. F. FORD, and D. A. SMITH (Duke Univ., Durham, N.C.) Dec. 1983 27 p refs  
(NAS3-23606; NSG-3160)  
(NASA-TP-2193; E-1719; NAS 1.60:2193) Avail: NTIS HC A03/MF A01 CSCL 12A

ALGORITHMS, CONVERGENCE, VECTORS (MATHEMATICS)

**N84-34204\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RATIONAL-SPLINE APPROXIMATION WITH AUTOMATIC TENSION ADJUSTMENT**

J. R. SCHIESS and P. A. KERR Oct. 1984 13 p refs  
(NASA-TP-2366; L-15826; NAS 1.60:2366) Avail: NTIS HC A02/MF A01 CSCL 12A

ALGORITHMS, APPROXIMATION, CURVE FITTING, LEAST SQUARES METHOD, TENSION

**N85-19733\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MODELING THE INTERNAL COMBUSTION ENGINE**

F. J. ZELENIN and B. J. MCBRIDE Mar. 1985 309 p refs  
(NASA-RP-1094; E-996; NAS 1.61:1094) Avail: NTIS HC A14/MF A01 CSCL 12A

A flexible and computationally economical model of the internal combustion engine was developed for use on large digital computer systems. It is based on a system of ordinary differential equations for cylinder-averaged properties. The computer program is capable of multicycle calculations, with some parameters varying from cycle to cycle, and has restart capabilities. It can accommodate a broad spectrum of reactants, permits changes in physical properties, and offers a wide selection of alternative modeling functions without any reprogramming. It readily adapts to the amount of information available in a particular case because the model is in fact a hierarchy of five models. The models range from a simple model requiring only thermodynamic properties to a complex model demanding full combustion kinetics, transport properties, and

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## STATISTICS AND PROBABILITY

poppet valve flow characteristics. Among its many features the model includes heat transfer, valve timing, supercharging, motoring, finite burning rates, cycle-to-cycle variations in air-fuel ratio, humid air, residual and recirculated exhaust gas, and full combustion kinetics. Author

**N85-28656\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**CONVERGENCE OF NEWTON'S METHOD FOR A SINGLE REAL EQUATION**

C. W. CAMPBELL Jun. 1985 23 p refs  
(NASA-TP-2489; NAS 1.60:2489) Avail: NTIS HC A02/MF A01 CSCL 12A

CONVERGENCE, FUNCTIONS (MATHEMATICS), NONLINEAR EQUATIONS, ROOTS OF EQUATIONS

**N86-18060\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE ALGORITHMS FOR RATIONAL SPLINE INTERPOLATION OF SURFACES**

J. R. SCHIESS Jan. 1986 27 p refs  
(NASA-TP-2536; L-16045; NAS 1.60:2536) Avail: NTIS HC A03/MF A01 CSCL 20F

ALGORITHMS, COMPUTER PROGRAMS, DISPLAY DEVICES, HIGH SPEED, SPLINE FUNCTIONS, TENSILE PROPERTIES, TENSOR ANALYSIS

**N86-27953\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MODIFIED DENAVIT-HARTENBERG PARAMETERS FOR BETTER LOCATION OF JOINT AXIS SYSTEMS IN ROBOT ARMS**

L. K. BARKER Washington Jul. 1986 30 p  
(NASA-TP-2585; L-16092; NAS 1.60:2585) Avail: NTIS HC A03/MF A01 CSCL 12A

ARM (ANATOMY), AXES OF ROTATION, JOINTS (ANATOMY), MANIPULATORS, ROBOTICS, SHOULDERS

**N86-28661\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SOLUTION OF ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS BY FAST POISSON SOLVERS USING A LOCAL RELAXATION FACTOR. 1: ONE-STEP METHOD**

S. C. CHANG May 1986 22 p Presented at the Ninth International Conference on Numerical Methods in Fluid Dynamics, Saclay, France, 25-29 Jun. 1984

(NASA-TP-2529; E-2461-1; NAS 1.60:2529) Avail: NTIS HC A02/MF A01 CSCL 12A

ALGORITHMS, ELLIPTIC DIFFERENTIAL EQUATIONS, ELLIPTIC FUNCTIONS, ITERATIVE SOLUTION, PARTIAL DIFFERENTIAL EQUATIONS

**N86-28662\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PHYSICAL AND NUMERICAL SOURCES OF COMPUTATIONAL INEFFICIENCY IN INTEGRATION OF CHEMICAL KINETIC RATE EQUATIONS: ETIOLOGY, TREATMENT AND PROGNOSIS**

D. T. PRATT (Washington Univ., Seattle) and K. RADHAKRISHNAN May 1986 12 p  
(NAG3-147)

(NASA-TP-2590; E-2587; NAS 1.60:2590) Avail: NTIS HC A02/MF A01 CSCL 12A

ALGORITHMS, CHEMICAL REACTIONS, CODING, COMPUTATION, COMPUTER PROGRAMS, REACTION KINETICS, VAPOR PHASES

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

**N78-31854\*#** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

**SIMULATION STUDY OF THE POWER OF THE KOLMOGOROFF-SMIRNOFF AND Z TESTS FOR THE EXPONENTIAL DISTRIBUTION**

J. B. GAYLE Sep. 1978 18 p refs  
(NASA-TP-1311) Avail: NTIS HC A02/MF A01 CSCL 12A

COMPUTERIZED SIMULATION, EXPONENTIAL FUNCTIONS, KOLMOGOROFF-SMIRNOFF TEST

**N81-23838\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**COMPUTER SIMULATION OF RANDOM VARIABLES AND VECTORS WITH ARBITRARY PROBABILITY DISTRIBUTION LAWS**

V. M. BOGDAN (Catholic Univ.) Washington May 1981 43 p refs  
(NASA-TP-1859; S-504) Avail: NTIS HC A03/MF A01 CSCL 12A

COMPUTERIZED SIMULATION, PROBABILITY DISTRIBUTION FUNCTIONS, RANDOM VARIABLES, VECTORS (MATHEMATICS)

**N81-27865\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**THE THEORY AND PRACTICE OF ESTIMATING THE ACCURACY OF DYNAMIC FLIGHT-DETERMINED COEFFICIENTS Final Report**

R. E. MAINE and K. W. ILIFF Jul. 1981 63 p refs  
(NASA-RP-1077; H-1128) Avail: NTIS HC A04/MF A01 CSCL 12A

Means of assessing the accuracy of maximum likelihood parameter estimates obtained from dynamic flight data are discussed. The most commonly used analytical predictors of accuracy are derived and compared from both statistical and simplified geometrics standpoints. The accuracy predictions are evaluated with real and simulated data, with an emphasis on practical considerations, such as modeling error. Improved computations of the Cramer-Rao bound to correct large discrepancies due to colored noise and modeling error are presented. The corrected Cramer-Rao bound is shown to be the best available analytical predictor of accuracy, and several practical examples of the use of the Cramer-Rao bound are given. Engineering judgement, aided by such analytical tools, is the final arbiter of accuracy estimation. Author

**N83-16095\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**GENERATION OF PSEUDO-RANDOM NUMBERS**

L. W. HOWELL and M. H. RHEINFURTH Dec. 1982 26 p refs

(NASA-TP-2105; NAS 1.60:2105) Avail: NTIS HC A03/MF A01 CSCL 12A

GENERATORS, MONTE CARLO METHOD, PSEUDORANDOM SEQUENCES, RANDOM NUMBERS

## 65 STATISTICS AND PROBABILITY

**N83-27679\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**AN EFFICIENT ALGORITHM FOR GENERATING RANDOM NUMBER PAIRS DRAWN FROM A BIVARIATE NORMAL DISTRIBUTION**

C. W. CAMPBELL Jun. 1983 17 p refs  
(NASA-TP-2173; NAS 1.60:2173) Avail: NTIS HC A02/MF A01 CSCL 12A  
DISTRIBUTION FUNCTIONS, MONTE CARLO METHOD, RANDOM NUMBERS

**N83-33631\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**ANALYSIS OF RANDOM SIGNAL COMBINATIONS FOR SPACECRAFT POINTING STABILITY**

L. HOWELL Aug. 1983 18 p refs  
(NASA-TP-2216; NAS 1.60:2216) Avail: NTIS HC A02/MF A01 CSCL 12A  
CONVOLUTION INTEGRALS, PROBABILITY DENSITY FUNCTIONS, RANDOM SIGNALS, RANDOM VARIABLES

**N85-16565\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**SPLINE METHODS FOR APPROXIMATING QUANTILE FUNCTIONS AND GENERATING RANDOM SAMPLES**

J. R. SCHIESS and C. G. MATTHEWS (Computer Sciences Corp.) Jan. 1985 34 p refs  
(NASA-TP-2389; L-15850; NAS 1.60:2389) Avail: NTIS HC A03/MF A01 CSCL 12A  
APPROXIMATION, PROBABILITY DISTRIBUTION FUNCTIONS, QUANTILES, RANDOM SAMPLING, SPLINE FUNCTIONS

**N86-19095\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**A STOCHASTIC MODEL FOR PARTICLE IMPINGEMENTS ON ORBITING SPACECRAFT**

L. W. HOWELL, JR. Jan. 1986 43 p refs  
(NASA-TP-2550; NAS 1.60:2550) Avail: NTIS HC A03/MF A01 CSCL 12A  
AEROSPACE ENVIRONMENTS, ANGULAR MOMENTUM, COSMIC RAYS, MOMENTUM TRANSFER, PARTICLE TRAJECTORIES, STOCHASTIC PROCESSES

## 66

### SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

**N78-30896\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.  
**PROCEDURES FOR GENERATION AND REDUCTION OF LINEAR MODELS OF A TURBOFAN ENGINE**

K. SELDNER and D. S. Cwynar Aug. 1978 45 p refs  
(NASA-TP-1261; E-9460) Avail: NTIS HC A03/MF A01 CSCL 12B  
COMPUTERIZED SIMULATION, MATHEMATICAL MODELS, TURBOFAN ENGINES

**N81-10789\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**STABILITY BOUNDARIES FOR SYSTEMS WITH FREQUENCY-MODEL FEEDBACK AND COMPLACENCY FILTER**

L. K. BARKER Nov. 1980 43 p refs  
(NASA-TP-1744; L-13787) Avail: NTIS HC A03/MF A01 CSCL 12B  
AUTOMATIC GAIN CONTROL, BOUNDARIES, ELECTRIC FILTERS, FEEDBACK CONTROL, LOW PASS FILTERS, PILOT PLANTS

**N81-12812\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**OPTIMAL REGULATION IN SYSTEMS WITH STOCHASTIC TIME SAMPLING**

R. C. MONTGOMERY and P. S. LEE Hampton, Va. Nov. 1980 29 p refs  
(NASA-TP-1743; L-13507) Avail: NTIS HC A03/MF A01 CSCL 12B  
AERODYNAMICS, MARKOV PROCESSES, STOCHASTIC PROCESSES, TIME OPTIMAL CONTROL

**N81-29902\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AUTOMATED DECISION MAKING AND PROBLEM SOLVING. VOLUME 2: CONFERENCE PRESENTATIONS**

E. HEER (Univ. of Southern California, Los Angeles) 1980 312 p refs Conf. held in Hampton, Va., 19-21 May 1980 2 Vol.  
(NASA-CP-2180-VOL-2; L-14396-VOL-2) Avail: NTIS HC A14/MF A01 CSCL 12B  
ARTIFICIAL INTELLIGENCE, AUTOMATA THEORY, CONFERENCES, DECISION MAKING, OPERATIONS RESEARCH, PROBLEM SOLVING, SYSTEMS SIMULATION

**N81-30889\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AUTOMATED DECISION MAKING AND PROBLEM SOLVING. VOLUME 1: EXECUTIVE SUMMARY**

E. HEER Aug. 1981 55 p refs Conf. held at Hampton, Va., 19-21 May 1980 2 Vol.  
(NASA-CP-2180-VOL-1; L-14396) Avail: NTIS HC A04/MF A01 CSCL 12B  
ARTIFICIAL INTELLIGENCE, AUTOMATIC CONTROL, CONTROL THEORY, DECISION MAKING, OPERATIONS RESEARCH, PROBLEM SOLVING

**N83-10876\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**NONLINEAR OPTIMIZATION WITH LINEAR CONSTRAINTS USING A PROJECTION METHOD**

T. FOX Sep. 1982 99 p refs  
(NASA-TP-2086; M-389; NAS 1.60:2086) Avail: NTIS HC A05/MF A01 CSCL 12B  
CONSTRAINTS, LINEAR SYSTEMS, NONLINEAR PROGRAMMING, NONLINEAR SYSTEMS, OPTIMIZATION, PROJECTIVE GEOMETRY

**N83-35736\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**DEVELOPMENT OF A DISTRIBUTED-PARAMETER MATHEMATICAL MODEL FOR SIMULATION OF CRYOGENIC WIND TUNNELS**

J. S. TRIPP Sep. 1983 50 p refs  
(NASA-TP-2177; L-15591; NAS 1.60:2177) Avail: NTIS HC A03/MF A01 CSCL 12B  
CRYOGENIC WIND TUNNELS, DISTRIBUTED PARAMETER SYSTEMS, SIMULATION

**N85-19784\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**IDENTIFICATION OF DYNAMIC SYSTEMS, THEORY AND FORMULATION**

R. E. MAINE and K. W. ILIFF Feb. 1985 138 p refs  
(NASA-RP-1138; H-1255; NAS 1.61:1138; AGARDOGRAPH-300)  
Avail: NTIS HC A07/MF A01 CSCL 12B

The problem of estimating parameters of dynamic systems is addressed in order to present the theoretical basis of system identification and parameter estimation in a manner that is complete and rigorous, yet understandable with minimal prerequisites. Maximum likelihood and related estimators are highlighted. The approach used requires familiarity with calculus, linear algebra, and probability, but does not require knowledge of stochastic processes or functional analysis. The treatment emphasizes unification of the various areas in estimation in dynamic systems is treated as a direct outgrowth of the static system theory. Topics covered include basic concepts and definitions; numerical optimization methods; probability; statistical estimators; estimation in static systems; stochastic processes; state estimation in dynamic systems; output error, filter error, and equation error methods of parameter estimation in dynamic systems, and the accuracy of the estimates.

Author

**N85-28708\*#** National Aeronautics and Space Administration, Washington, D.C.

**ADDING COMPUTATIONALLY EFFICIENT REALISM TO MONTE CARLO TURBULENCE SIMULATION**

C. W. CAMPBELL May 1985 21 p refs  
(NASA-TP-2469; M-485; NAS 1.60:2469) Avail: NTIS HC A02/MF A01 CSCL 12B

COMPUTERIZED SIMULATION, FLIGHT SIMULATION, LOW LEVEL TURBULENCE, MONTE CARLO METHOD

**N85-33745\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**A FORMULATION AND ANALYSIS OF COMBAT GAMES**

M. HEYMANN (Technion-Israel Inst. of Tech., Haifa), M. D. ARDEMA, and N. RAJAN (Stanford Univ., Calif.) Jun. 1985 44 p refs

(NASA-TP-2487; REPT-85022; NAS 1.60:2487) Avail: NTIS HC A03/MF A01 CSCL 12B

COMBAT, GAME THEORY, MATHEMATICAL MODELS, PROBABILITY THEORY

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### THEORETICAL MATHEMATICS

Includes topology and number theory.

**N79-18679\*#** National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.

**A CHARACTERIZATION OF THE REAL ZEROS OF A PARTICULAR TRANSCENDENTAL FUNCTION**

D. R. HEDGLEY Mar. 1979 12 p refs  
(NASA-TP-1420; H-1065) Avail: NTIS HC A02/MF A01 CSCL 12A

NUMERICAL ANALYSIS, REAL VARIABLES, TRANSCENDENTAL FUNCTIONS

**N84-15880\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**THE GENERALIZED EULER-MASCHERONI CONSTANTS**

O. R. AINSWORTH (Alabama Univ.) and L. W. HOWELL Jan. 1984 15 p refs  
(NASA-TP-2264; NAS 1.60:2264) Avail: NTIS HC A02/MF A01 CSCL 12A

COMPUTATION, CONSTANTS, MEROMORPHIC FUNCTIONS, POWER SERIES, SERIES EXPANSION

## 70

### PHYSICS (GENERAL)

**N80-29096\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**PROCEEDINGS OF THE ELEVENTH ANNUAL PRECISE TIME AND TIME INTERVAL (PTTI) APPLICATION AND PLANNING MEETING**

S. C. WARDRIIP, ed. 1979 703 p refs Meeting held in Greenbelt, Md., 27-29 Nov. 1979; sponsored by NASA. Goddard Space Flight Center, Naval Electronics Systems Command, Naval Research Lab., Naval Observatory, and Defense Communications Agency

(NASA-CP-2129) Avail: NTIS HC A99/MF A01 CSCL 14B  
COMMUNICATION NETWORKS, CONFERENCES, SYNCHRONISM, TIME MEASUREMENT, TIME SIGNALS

## 71

### ACOUSTICS

Includes sound generation, transmission, and attenuation.

**N77-30908\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FINITE-DIFFERENCE THEORY FOR SOUND PROPAGATION IN A LINED DUCT WITH UNIFORM FLOW USING THE WAVE ENVELOPE CONCEPT**

K. J. BAUMEISTER Washington Aug. 1977 64 p refs  
(NASA-TP-1001; E-9149) Avail: NTIS HC A04/MF A01 CSCL 20A

ACOUSTIC DUCTS, FINITE DIFFERENCE THEORY, SOUND PROPAGATION, UNIFORM FLOW

**N77-30909\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**ACOUSTIC PERFORMANCE OF TWO 1.83-METER-DIAMETER FANS DESIGNED FOR A WIND-TUNNEL DRIVE SYSTEM**

P. R. SODERMAN and V. R. PAGE Aug. 1977 76 p refs Prepared in cooperation with US Army Air Mobility Research and Development Lab., Moffett Field, Calif.  
(NASA-TP-1008; A-6888) Avail: NTIS HC A05/MF A01 CSCL 20A

ACOUSTIC MEASUREMENT, AERODYNAMIC NOISE, FANS, NOISE INTENSITY, WIND TUNNEL DRIVES

**N78-12800\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MEASUREMENTS OF THE TONAL COMPONENT OF CAVITY NOISE AND COMPARISON WITH THEORY**

P. J. W. BLOCK Nov. 1977 34 p refs  
(NASA-TP-1013; L-11620) Avail: NTIS HC A03/MF A01 CSCL 20A

AIRCRAFT NOISE, CAVITATION FLOW, CAVITY RESONATORS, FREQUENCY MEASUREMENT, NOISE GENERATORS

## 71 ACOUSTICS

**N78-12801\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN EXPERIMENTAL EVALUATION OF THE APPLICATION OF THE KIRCHHOFF FORMULATION FOR SOUND RADIATION FROM AN OSCILLATING AIRFOIL**

T. F. BROOKS Washington Dec. 1977 39 p refs  
(NASA-TP-1048; L-11479) Avail: NTIS HC A03/MF A01  
CSCL 20A

AEROACOUSTICS, AERODYNAMIC NOISE, KIRCHHOFF LAW OF RADIATION, WING OSCILLATIONS

**N78-17823\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PREDICTION OF GROUND EFFECTS ON AIRCRAFT NOISE**

S. P. PAO, A. R. WENZEL, and P. B. ONCLEY (MAN-Acoustics and Noise, Inc.) Jan. 1978 42 p refs  
(NASA-TP-1104; L-11833) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT NOISE, GROUND EFFECT (AERODYNAMICS), SOUND PROPAGATION

**N78-23877\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NOISE TRANSMISSION THROUGH PLATES INTO AN ENCLOSURE M.S. Thesis - George Washington Univ.**

W. B. MCDONALD (Joint Inst. for Advancement of Flight Sciences, Washington, D. C.), R. VAICAITIS, and M. K. MYERS (Joint Inst. for Advancement of Flight Sciences, Washington, D. C.) May 1978 44 p refs  
(NASA-TP-1173; L-11906) Avail: NTIS HC A03/MF A01  
CSCL 20A

ELASTIC PLATES, NOISE PROPAGATION

**N78-32816\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HELICOPTER ACOUSTICS**

Aug. 1978 399 p refs Presented at the Intern. Specialists Symp., Hampton, Va., 22-24 May 1978; sponsored by the Am. Helicopter Soc. and AROD  
(NASA-CP-2052-PT-1; L-12339) Avail: NTIS HC A17/MF A01  
CSCL 20A

AEROACOUSTICS, AIRCRAFT NOISE, CONFERENCES, HELICOPTERS

**N79-10843\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HELICOPTER ACOUSTICS, PART 2**

Aug. 1978 438 p refs Presented at the Intern. Specialists Symp., Hampton, Va., 22-24 May 1978; sponsored by the Am. Helicopter Soc. and AROD  
(NASA-CP-2052-PT-2; L-12339-PT-2) Avail: NTIS HC A19/MF A01  
CSCL 20A

AEROACOUSTICS, AIRCRAFT NOISE, CONFERENCES, HELICOPTERS

**N79-13821\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A THEORETICAL INVESTIGATION OF NOISE REDUCTION THROUGH THE CYLINDRICAL FUSELAGE OF A TWIN-ENGINE, PROPELLER-DRIVEN AIRCRAFT**

R. B. BHAT and J. S. MIXSON Dec. 1978 47 p refs  
(NASA-TP-1325; L-12225) Avail: NTIS HC A03/MF A01  
CSCL 20A

CYLINDRICAL SHELLS, FUSELAGES, NOISE REDUCTION, PROPELLER DRIVE

**N79-14872\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A COMPARISON OF THE NOISE PRODUCED BY A SMALL JET ON A MOVING VEHICLE WITH THAT IN A FREE JET**

T. D. NORUM Dec. 1978 24 p refs  
(NASA-TP-1326; L-12383) Avail: NTIS HC A02/MF A01  
CSCL 20A

AUTOMOBILES, FREE JETS, JET AIRCRAFT NOISE, JET FLOW, JET MIXING FLOW, NOISE SPECTRA

**N79-14874\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NOISE TRANSMISSION THROUGH FLAT RECTANGULAR PANELS INTO A CLOSED CAVITY**

C. K. BARTON and E. F. DANIELS Dec. 1978 29 p refs  
(NASA-TP-1321; L-12439) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT NOISE, CAVITIES, FLAT SURFACES, LIGHT AIRCRAFT, NOISE PROPAGATION, RECTANGULAR PANELS

**N79-16641\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLUCTUATING LOADS MEASURED ON AN OVER-THE-WING SUPERSONIC JET MODEL**

C. M. WILLIS Jan. 1979 41 p refs  
(NASA-TP-1366; L-12511) Avail: NTIS HC A03/MF A01  
CSCL 20A

AERODYNAMIC CONFIGURATIONS, AIRCRAFT MODELS, JET ENGINES, LOADS (FORCES), PRESSURE MEASUREMENT, SUPERSONIC CRUISE AIRCRAFT RESEARCH

**N79-17659\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COMPUTATION OF ATMOSPHERIC ATTENUATION OF SOUND FOR FRACTIONAL-OCTAVE BANDS**

F. J. MONTEGANI Feb. 1979 32 p refs  
(NASA-TP-1412; E-9763) Avail: NTIS HC A03/MF A01  
CSCL 20A

ATMOSPHERIC ATTENUATION, COMPUTER PROGRAMS, SOUND PROPAGATION, WAVE PROPAGATION

**N79-18687\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VARIABILITY OF ANNOYANCE RESPONSE DUE TO AIRCRAFT NOISE**

T. K. DEMPSEY and J. M. CAWTHORN Mar. 1979 77 p refs  
(NASA-TP-1335; L-12483) Avail: NTIS HC A05/MF A01  
CSCL 20A

AIRCRAFT NOISE, HUMAN TOLERANCES, NOISE THRESHOLD, VARIABILITY

**N79-19813\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLUCTUATING SURFACE PRESSURE AND ACOUSTIC RADIATION FOR SUBSONIC NORMAL JET IMPINGEMENT**

J. S. PREISSER Mar. 1979 56 p refs  
(NASA-TP-1361; L-12412) Avail: NTIS HC A04/MF A01  
CSCL 20A

JET IMPINGEMENT, PRESSURE, SOUND WAVES, SUBSONIC SPEED, VARIATIONS

**N79-20832\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF DURATION AND OTHER NOISE CHARACTERISTICS ON THE ANNOYANCE CAUSED BY AIRCRAFT-FLYOVER NOISE**

D. A. MCCURDY and C. A. POWELL Mar. 1979 47 p refs  
(NASA-TP-1386; L-12579) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT NOISE, EFFECTIVE PERCEIVED NOISE LEVELS, NOISE TOLERANCE, PSYCHOACOUSTICS, PSYCHOLOGICAL EFFECTS

**N79-22849\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A CORRELATION OF MIXING NOISE FROM COANNULAR JETS WITH INVERTED FLOW PROFILES**

S. P. PAO Apr. 1979 127 p refs  
(NASA-TP-1301; L-12155) Avail: NTIS HC A07/MF A01  
CSCL 20A

DATA CORRELATION, FLOW DISTRIBUTION, JET AIRCRAFT NOISE, JET MIXING FLOW

**N79-24773\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STATISTICAL COMPARISONS OF AIRCRAFT FLYOVER NOISE ADJUSTMENT PROCEDURES FOR DIFFERENT WEATHER CONDITIONS**

A. W. MUELLER and D. A. HILTON May 1979 35 p refs  
(NASA-TP-1430; L-12626) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT NOISE, NOISE INTENSITY, NOISE SPECTRA, STATISTICAL ANALYSIS

**N79-32057\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EVALUATION OF A VORTEX MODEL OF TURBULENT CAVITY FLOW**

J. C. HARDIN and P. J. W. BLOCK Sep. 1979 47 p refs  
(NASA-TP-1505; L-12684) Avail: NTIS HC A03/MF A01  
CSCL 20A

AEROACOUSTICS, AERODYNAMIC NOISE, CAVITATION FLOW, FLUID DYNAMICS, MATHEMATICAL MODELS, NOISE MEASUREMENT, TURBULENCE, VORTICES

**N80-11869\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**A CLOSED-FORM SOLUTION FOR NOISE CONTOURS**

E. C. STEWART and T. M. CARSON Nov. 1979 40 p refs  
(NASA-TP-1432; A-7660) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT NOISE, CONTOURS, NOISE REDUCTION

**N80-13879\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL STUDY OF ACOUSTIC LOADS ON AN UPPER-SURFACE-BLOWN STOL AIRPLANE CONFIGURATION**

C. M. WILLIS and J. A. SCHOENSTER Dec. 1979 57 p  
(NASA-TP-1577; L-13167) Avail: NTIS HC A04/MF A01  
CSCL 20A

AEROACOUSTICS, AERODYNAMIC LOADS, SHORT TAKEOFF AIRCRAFT, SOUND PRESSURE, UPPER SURFACE BLOWN FLAPS, WIND TUNNEL TESTS

**N80-13880\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF SOUND LEVEL FLUCTUATIONS ON ANNOYANCE CAUSED BY AIRCRAFT-FLYOVER NOISE**

D. A. MCCURDY Dec. 1979 40 p refs  
(NASA-TP-1576; L-13181) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT NOISE, HUMAN TOLERANCES, NOISE INTENSITY, PSYCHOACOUSTICS, VARIATIONS

**N80-14840\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EVALUATION OF HELICOPTER NOISE DUE TO B BLADE-VORTEX INTERACTION FOR FIVE TIP CONFIGURATIONS**

D. R. HOAD Dec. 1979 80 p refs Prepared jointly with AVRADCOM, Hampton, Va.  
(DA PROJ. 1L2-62209-AH-76)  
(NASA-TP-1608; AVRADCOM-TR-80-B-1; L-13207) Avail: NTIS HC A05/MF A01  
CSCL 20A

AIRCRAFT NOISE, BLADE TIPS, HELICOPTERS, NOISE REDUCTION, VORTICES

**N80-18882\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**APPLICATION OF COHERENCE IN FAN NOISE STUDIES**

J. R. BALOMBIN Feb. 1980 26 p refs  
(NASA-TP-1630; E-157) Avail: NTIS HC A03/MF A01  
CSCL 20A

ACOUSTICS, COHERENT RADIATION, INTAKE SYSTEMS, SIGNAL PROCESSING

**N80-23100\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FORWARD ACOUSTIC PERFORMANCE OF A SHOCK-SWALLOWING HIGH-TIP-SPEED FAN (OF-13)**

J. G. LUCAS, R. P. WOODWARD, and M. J. MACKINNON May 1980 20 p refs  
(NASA-TP-1668; E-202) Avail: NTIS HC A02/MF A01  
CSCL 20A

ACOUSTIC MEASUREMENT, AERODYNAMIC CHARACTERISTICS, BLADE TIPS, NOISE REDUCTION, ROTOR AERODYNAMICS, SHOCK WAVE ATTENUATION, TURBOFANS

**N80-27161\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A NUMERICAL TECHNIQUE FOR CALCULATION OF THE NOISE OF HIGH-SPEED PROPELLERS WITH ADVANCED BLADE GEOMETRY**

P. A. NYSTROM and F. FARASSAT Jul. 1980 33 p refs  
(NASA-TP-1662; L-13535) Avail: NTIS HC A03/MF A01  
CSCL 20A

COMPUTER PROGRAMS, HIGH SPEED, NOISE PREDICTION (AIRCRAFT), PROPELLER BLADES

**N80-28150\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TIME-OF-DAY CORRECTIONS TO AIRCRAFT NOISE METRICS**

S. CLEVENSON, ed. and W. T. SHEPHERD, ed. (FAA) Jun. 1980 81 p Workshop held in Hampton, Va., 11-12 Mar. 1980; sponsored by NASA and DOT  
(NASA-CP-2135; FAA-EE-80-3; L-13779) Avail: NTIS HC A05/MF A01  
CSCL 20A

CONFERENCES, ENVIRONMENTAL QUALITY, NOISE MEASUREMENT, NOISE PREDICTION (AIRCRAFT), NOISE TOLERANCE

**N80-32188\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL INVESTIGATION OF THE RADIATION OF SOUND FROM AN UNFLANGED DUCT AND A BELLMOUTH, INCLUDING THE FLOW EFFECT**

J. M. VILLE (George Washington Univ.) and R. J. SILCOX Aug. 1980 65 p refs  
(NASA-TP-1697; L-13252) Avail: NTIS HC A04/MF A01  
CSCL 20A

ENGINE INLETS, ENGINE NOISE, NOISE PROPAGATION

**N81-14788\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ASSESSMENT OF GROUND EFFECTS ON THE PROPAGATION OF AIRCRAFT NOISE: THE T-38A FLIGHT EXPERIMENT**

W. L. WILLSHIRE, JR. Dec. 1980 128 p refs  
(NASA-TP-1747; L-13765) Avail: NTIS HC A07/MF A01  
CSCL 20A

AIRCRAFT NOISE, FLIGHT TESTS, GROUND EFFECT (AERODYNAMICS), NOISE PROPAGATION

**N81-21873\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SUBJECTIVE FIELD STUDY OF RESPONSE TO IMPULSIVE HELICOPTER NOISE**

C. A. POWELL Apr. 1981 43 p refs  
(NASA-TP-1833; L-14205) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT NOISE, EFFECTIVE PERCEIVED NOISE LEVELS,

## 71 ACOUSTICS

HELICOPTERS, NOISE PREDICTION (AIRCRAFT),  
PSYCHOACOUSTICS

**N81-22832\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**AIRFRAME NOISE OF A SMALL MODEL TRANSPORT  
AIRCRAFT AND SCALING EFFECTS**

J. G. SHEARIN May 1981 27 p refs  
(NASA-TP-1858; L-14257) Avail: NTIS HC A03/MF A01  
CSCL 20A

AEROACOUSTICS, AIRCRAFT NOISE, AIRFRAMES, BOEING  
747 AIRCRAFT, NOISE PREDICTION (AIRCRAFT), SCALE  
EFFECT

**N81-24854\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**STOCHASTIC ANALYSIS OF SPECTRAL BROADENING BY A  
FREE TURBULENT SHEAR LAYER**

J. C. HARDIN and J. S. PREISSER May 1981 27 p refs  
(NASA-TP-1816; L-14444) Avail: NTIS HC A03/MF A01  
CSCL 20A

AEROACOUSTICS, AMPLITUDE MODULATION, FREE JETS,  
POWER SPECTRA, SHEAR LAYERS, SOUND PROPAGATION

**N81-33945\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**FLIGHT TEST OF A PURE-TONE ACOUSTIC SOURCE**

A. W. MUELLER and J. S. PREISSER Oct. 1981 39 p refs  
(NASA-TP-1898; L-14600) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT NOISE, FLIGHT TESTS, NOISE MEASUREMENT,  
NOISE PROPAGATION

**N81-33946\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**NOISE SUPPRESSION CHARACTERISTICS OF PERIPHERALLY  
SEGMENTED DUCT LINERS**

W. R. WATSON Sep. 1981 43 p refs  
(NASA-TP-1904; L-14521) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRCRAFT ENGINES, DUCTS, ENGINE NOISE, LININGS,  
NOISE REDUCTION

**N81-33947\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**COMPUTER PROGRAM TO PREDICT AIRCRAFT NOISE  
LEVELS**

B. J. CLARK Sep. 1981 146 p  
(NASA-TP-1913; E-733) Avail: NTIS HC A07/MF A01 CSCL  
20A

COMPUTER PROGRAMS, JET AIRCRAFT NOISE, NOISE  
PREDICTION (AIRCRAFT), SOUND INTENSITY

**N82-14879\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**EXPERIMENTAL STUDY OF NOISE REDUCTION FOR AN  
UNSTIFFENED CYLINDRICAL MODEL OF AN AIRPLANE  
FUSELAGE**

C. M. WILLIS and E. F. DANIELS Dec. 1981 36 p refs  
(NASA-TP-1964; L-14878) Avail: NTIS HC A03/MF A01  
CSCL 20A

AIRFRAMES, FUSELAGES, NOISE MEASUREMENT, NOISE  
REDUCTION

**N82-21036\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**FORWARD ACOUSTIC PERFORMANCE OF A MODEL  
TURBOFAN DESIGNED FOR A HIGH SPECIFIC FLOW (QF-14)**

J. G. LUCAS, R. P. WOODWARD, and C. J. MICHELS Mar.  
1982 20 p refs  
(NASA-TP-1968; E-777; NAS 1.60:1968) Avail: NTIS HC  
A02/MF A01 CSCL 20A

ENGINE DESIGN, ENGINE NOISE, JET AIRCRAFT NOISE,  
NOISE REDUCTION, TIP SPEED, TURBOFAN ENGINES

**N82-21037\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**FLUCTUATING PRESSURES ON FAN BLADES OF A TURBOFAN  
ENGINE: STATIC AND WIND-TUNNEL INVESTIGATIONS**

J. A. SCHOENSTER Mar. 1982 48 p refs  
(NASA-TP-1976; L-14913; NAS 1.60:1976) Avail: NTIS HC  
A03/MF A01 CSCL 21E

ENGINE NOISE, NOISE MEASUREMENT, STATIC TESTS,  
TURBINE BLADES, TURBOFAN ENGINES, WIND TUNNEL  
TESTS

**N82-24052\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

**A STUDY OF RESONANT-CAVITY AND FIBERGLASS-FILLED  
PARALLEL BAFFLES AS DUCT SILENCERS**

P. T. SODERMAN Apr. 1982 68 p refs  
(NASA-TP-1970; NAS 1.60:1970; AVRADCOM-TR-81-A-2) Avail:  
NTIS HC A04/MF A01 CSCL 20A

ACOUSTIC ATTENUATION, BAFFLES, CAVITY  
RESONATORS, DUCTS, GLASS FIBERS, SILENCERS, SOUND  
PROPAGATION, WIND TUNNEL APPARATUS

**N82-24942\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**AEROACOUSTIC PERFORMANCE OF AN EXTERNALLY  
BLOWN FLAP CONFIGURATION WITH SEVERAL FLAP NOISE  
SUPPRESSION DEVICES**

D. J. MCKINZIE, JR. May 1982 30 p refs  
(NASA-TP-1995; E-573; NAS 1.60:1995) Avail: NTIS HC  
A03/MF A01 CSCL 20A

AEROACOUSTICS, AERODYNAMIC NOISE, EXTERNALLY  
BLOWN FLAPS, JET AIRCRAFT NOISE, NOISE REDUCTION

**N82-31069\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**NOISE TRANSMISSION LOSS OF AIRCRAFT PANELS USING  
ACOUSTIC INTENSITY METHODS**

M. C. MCGARY Aug. 1982 37 p refs  
(NASA-TP-2046; L-15306; NAS 1.60:2046) Avail: NTIS HC  
A03/MF A01 CSCL 20A

AIRCRAFT NOISE, AIRCRAFT STRUCTURES, PANELS,  
SOUND TRANSMISSION, TRANSMISSION LOSS

**N82-31070\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**AIRPORT/COMMUNITY NOISE**

D. G. STEPHENS, comp. 1982 40 p Proceedings of a  
Workshop held at Hampton, Va., 25-26 Feb. 1982  
(NASA-CP-2241; L-1545; NAS 1.55:2241) Avail: NTIS HC  
A03/MF A01 CSCL 13B

AIRPORTS, ENGINE NOISE, JET AIRCRAFT NOISE, NOISE  
POLLUTION, NOISE REDUCTION

**N82-34189\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**SUPERSONIC JET NOISE GENERATED BY LARGE SCALE  
INSTABILITIES**

J. M. SEINER, D. K. MCLAUGHLIN (Dynamics Technology, Inc.),  
and C. H. LIU Sep. 1982 45 p refs  
(NASA-TP-2072; L-15307; NAS 1.60:2072) Avail: NTIS HC  
A03/MF A01 CSCL 20A

AIRCRAFT NOISE, FLOW DISTORTION, FLOW STABILITY,  
REYNOLDS NUMBER, SHEAR LAYERS, SUPERSONIC JET  
FLOW

**N82-34190\*#** National Aeronautics and Space Administration.  
Langley Research Center, Hampton, Va.

**CIRCUMFERENTIALLY SEGMENTED DUCT LINES OPTIMIZED  
FOR AXISYMMETRIC AND STANDING WAVE SOURCES**

W. R. WATSON 1982 50 p refs  
(NASA-TP-2075; L-15316; NAS 1.60:2075) Avail: NTIS HC  
A03/MF A01 CSCL 20A

ACOUSTIC DUCTS, AXISYMMETRIC FLOW, LININGS, NOISE



REDUCTION, OPTIMIZATION, STANDING WAVES, TURBOFAN ENGINES

**N83-10883\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLIGHT EFFECTS OF FAN NOISE**

D. CHESTNUTT, ed. Sep. 1982 128 p refs Presented at the Workshop on Res. on the Simulation of In-Flight Fan Noise and Flight Effects, Hampton, Va., 26-27 Jan. 1982 (NASA-CP-2242; L-15493; NAS 1.55:2242) Avail: NTIS HC A07/MF A01 CSCL 20A

AIRCRAFT NOISE, CONFERENCES, ENGINE NOISE, INTAKE SYSTEMS, NOISE REDUCTION

**N83-11838\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A NEW MEASUREMENT METHOD FOR SEPARATING AIRBORNE AND STRUCTUREBORNE NOISE RADIATED BY AIRCRAFT TYPE PANELS**

M. C. MCGARY Sep. 1982 33 p refs (NASA-TP-2079; L-15481; NAS 1.60:2079) Avail: NTIS HC A03/MF A01 CSCL 20A

ACOUSTIC MEASUREMENT, AERODYNAMIC NOISE, AIRCRAFT NOISE, PANELS, SOUND INTENSITY, STRUCTURAL VIBRATION

**N83-16149\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EMPIRICAL SOURCE NOISE PREDICTION METHOD WITH APPLICATION TO SUBSONIC COAXIAL JET MIXING NOISE**

W. E. ZORUMSKI and D. S. WEIR (Kentron International, Inc., Hampton, Va.) Dec. 1982 77 p refs (NASA-TP-2084; L-15382; NAS 1.60:2084) Avail: NTIS HC A05/MF A01 CSCL 20A

COAXIAL NOZZLES, JET AIRCRAFT NOISE, JET MIXING FLOW, NOISE PREDICTION (AIRCRAFT), NOISE REDUCTION, SOUND GENERATORS

**N83-30164\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE WEDGE HOT-FILM ANEMOMETER IN SUPERSONIC FLOW**

J. M. SEINER May 1983 58 p refs (NASA-TP-2134; L-15538; NAS 1.60:2134) Avail: NTIS HC A04/MF A01 CSCL 20A

ANEMOMETERS, HEAT TRANSFER, SUPERSONIC FLOW, TURBULENT FLOW

**N83-33684\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF JET-INSTALLATION NOISE SOURCES UNDER STATIC CONDITIONS**

J. G. SHEARIN Aug. 1983 33 p refs (NASA-TP-2181; L-15599; NAS 1.61:2181) Avail: NTIS HC A03/MF A01 CSCL 20A

AEROACOUSTICS, JET AIRCRAFT NOISE, JET EXHAUST, NOISE GENERATORS, WING FLAPS, WING NACELLE CONFIGURATIONS

**N83-34713\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**RESIDENTS' ANNOYANCE RESPONSES TO AIRCRAFT NOISE EVENTS**

T. K. DEMPSEY, D. G. STEPHENS, J. M. FIELDS (Bionetics Corp.), and K. P. SHEPHERD (Bionetics Corp.) Sep. 1983 42 p refs (NASA-TP-2121; L-15595; NAS 1.60:2121) Avail: NTIS HC A03/MF A01 CSCL 20A

AIRCRAFT NOISE, AIRPORTS, JET AIRCRAFT NOISE, NOISE MEASUREMENT

**N84-10913\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF EFFECTS OF MICROPHONE POSITION AND ORIENTATION ON NEAR-GROUND NOISE MEASUREMENTS**

W. L. WILLSHIRE, JR. and P. A. NYSTROM Apr. 1982 45 p refs (NASA-TP-2004; L-15097; NAS 1.60:2004) Avail: NTIS HC A03/MF A01 CSCL 20A

ACOUSTICS, MICROPHONES, MOUNTING, NOISE MEASUREMENT, POSITION (LOCATION)

**N84-13923\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE COMPRESSIBLE AERODYNAMICS OF ROTATING BLADES BASED ON AN ACOUSTIC FORMULATION**

L. N. LONG Dec. 1983 70 p refs (NASA-TP-2197; L-15652; NAS 1.60:2197) Avail: NTIS HC A04/MF A01 CSCL 20A

COMPRESSIBILITY EFFECTS, PROPELLER BLADES, ROTATING BODIES, ROTOR AERODYNAMICS

**N84-15894\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FLUID SHIELDING OF HIGH-VELOCITY JET NOISE**

J. H. GOODYKOONTZ Jan. 1984 22 p refs (NASA-TP-2259; E-1705; NAS 1.60:2259) Avail: NTIS HC A02/MF A01 CSCL 20A

EXHAUST NOZZLES, HIGH TEMPERATURE GASES, JET AIRCRAFT NOISE, JET EXHAUST, NOISE REDUCTION, SHIELDING

**N84-19049\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**SIMPLIFIED COMBUSTION NOISE THEORY YIELDING A PREDICTION OF FLUCTUATING PRESSURE LEVEL**

R. G. HUFF Feb. 1984 17 p refs (NASA-TP-2237; E-1856; NAS 1.60:2237) Avail: NTIS HC A02/MF A01 CSCL 20A

COMBUSTION PHYSICS, NOISE MEASUREMENT, PRESSURE MEASUREMENT

**N84-21277\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TEST-ENGINE AND INLET PERFORMANCE OF AN AIRCRAFT USED FOR INVESTIGATING FLIGHT EFFECTS ON FAN NOISE**

R. A. GOLUB and J. S. PREISSER Apr. 1984 70 p refs (NASA-TP-2254; L-15653; NAS 1.60:2254) Avail: NTIS HC A04/MF A01 CSCL 20A

DISTORTION, ENGINE TESTS, FLOW DISTRIBUTION, POTENTIAL FLOW, STATIC TESTS, TURBOFAN ENGINES, WIND TUNNEL TESTS

**N84-22363\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**STUDY OF STATOR-VANE FLUCTUATING PRESSURES IN A TURBOFAN ENGINE FOR STATIC AND FLIGHT TESTS**

A. W. MUELLER Apr. 1984 54 p refs (NASA-TP-2217; L-15657; NAS 1.60:2217) Avail: NTIS HC A04/MF A01 CSCL 20A

ENGINE NOISE, ENGINE TESTS, FLIGHT TESTS, PRESSURE OSCILLATIONS, ROTOR AERODYNAMICS, STATORS, TURBOFAN ENGINES, VANES

**N84-25422\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF SIMULATED FLIGHT ON THE STRUCTURE AND NOISE OF UNDEREXPANDED JETS**

T. D. NORUM and J. G. SHEARIN May 1984 32 p refs (NASA-TP-2308; L-15760; NAS 1.60:2308) Avail: NTIS HC A03/MF A01 CSCL 20A

CONVERGENT NOZZLES, FLIGHT SIMULATION, JET AIRCRAFT NOISE, JET MIXING FLOW

## 71 ACOUSTICS

**N84-27543\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A NEW METHOD FOR DETERMINING ACOUSTIC-LINER ADMITTANCE IN A RECTANGULAR DUCT WITH GRAZING FLOW FROM EXPERIMENTAL DATA**

W. R. WATSON Jul. 1984 19 p refs  
(NASA-TP-2310; L-15779; NAS 1.60:2310) Avail: NTIS HC  
A02/MF A01 CSCL 20A

ACOUSTIC DUCTS, ACOUSTIC MEASUREMENT, AEROACOUSTICS, ELECTRICAL IMPEDANCE, FLOW DISTRIBUTION, FLOW VELOCITY, GRAZING FLOW

**N84-29662\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ROTORCRAFT NOISE**

R. J. HUSTON, comp. Washington Jul. 1982 424 p refs  
Proc. of the NASA/US Helicopter Ind. Workshop on Aerodyn. Noise Prediction/Noise Reduction, Hampton, Va., 29-31 Mar. 1982  
(NASA-CP-2234; L-15408; NAS 1.55:2234) Avail: NTIS HC  
A18/MF A01 CSCL 20A

AERODYNAMIC NOISE, HELICOPTERS, NOISE REDUCTION, PREDICTION ANALYSIS TECHNIQUES

**N84-32124\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANNOYANCE CAUSED BY PROPELLER AIRPLANE FLYOVER NOISE**

D. A. MCCURDY and C. A. POWELL Aug. 1984 52 p refs  
(NASA-TP-2356; L-15796; NAS 1.60:2356) Avail: NTIS HC  
A04/MF A01 CSCL 20A

AIRCRAFT NOISE, PROPELLER BLADES, PSYCHOACOUSTICS, TOLERANCES (PHYSIOLOGY)

**N85-11788\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYSIS OF NOISE MEASURED FROM A PROPELLER IN A WAKE**

P. J. W. BLOCK Nov. 1984 49 p refs  
(NASA-TP-2358; L-15808; NAS 1.60:2358) Avail: NTIS HC  
A03/MF A01 CSCL 20A

AERODYNAMIC NOISE, AIRCRAFT WAKES, NOISE MEASUREMENT, PROPELLERS, WIND TUNNEL TESTS

**N85-11789\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOW-FREQUENCY SOUND ABSORPTION MEASUREMENTS IN AIR**

A. J. ZUCKERWAR and R. W. MEREDITH (Old Dominion Univ.) Nov. 1984 48 p refs  
(NASA-RP-1128; L-15831; NAS 1.61:1128) Avail: NTIS HC  
A03/MF A01 CSCL 20A

Thirty sets of sound absorption measurements in air at a pressure of 1 atmosphere are presented at temperatures from 10 C to 50 C, relative humidities from 0 to 100 percent, and frequencies from 10 to 2500 Hz. The measurements were conducted by the method of free decay in a resonant tube having a length of 18.261 m and bore diameter of 0.152 m. Background measurements in a gas consisting of 89.5 percent N<sub>2</sub> and 10.5 percent Ar, a mixture which has the same sound velocity as air, permitted the wall and structural losses of the tube to be separated from the constituent absorption, consisting of classical rotational and vibrational absorption, in the air samples. The data were used to evaluate the vibrational relaxation frequencies of N<sub>2</sub> and/or O<sub>2</sub> for each of the 30 sets of meteorological parameters. Over the full range of humidity, the measured relaxation frequencies of N<sub>2</sub> in air lie between those specified by ANSI Standard S1.26-1978 and those measured earlier in binary N<sub>2</sub>H<sub>2</sub>O mixtures. The measured relaxation frequencies could be determined only at very low values of humidity, reveal a significant trend away from the ANSI standard, in agreement with a prior investigation. Author

**N85-19790\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**FLUCTUATING PRESSURES ON FAN BLADES OF A TURBOFAN ENGINE, FLIGHT TEST INVESTIGATION**

J. A. SCHOENSTER Feb. 1985 26 p refs  
(NASA-TP-2381; L-15700; NAS 1.60:2381) Avail: NTIS HC  
A03/MF A01 CSCL 20A

AIRCRAFT NOISE, FAN BLADES, TURBOFAN ENGINES, WIND TUNNEL TESTS

**N85-22109\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**NOISE TRANSMISSION LOSS OF A RECTANGULAR PLATE IN AN INFINITE BAFFLE**

L. A. ROUSSOS Mar. 1985 36 p refs Presented at the 107th Meeting of the Acoustical Society of America, Norfolk, Va., 7-10 May 1984

(NASA-TP-2398; L-15861; NAS 1.60:2398) Avail: NTIS HC  
A03/MF A01 CSCL 20A

AERODYNAMIC NOISE, GREEN'S FUNCTIONS, INTEGRAL EQUATIONS, NOISE PROPAGATION, RECTANGULAR PANELS, TRANSMISSION LOSS

**N85-29694\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**CORRELATION OF PREDICTED AND MEASURED SONIC BOOM CHARACTERISTICS FROM THE REENTRY OF STS-1 ORBITER**

F. GARCIA, JR., J. H. JONES (NASA. Marshall Space Flight Center), and H. R. HENDERSON (NASA. Langley Research Center) Jun. 1985 49 p refs

(NASA-TP-2475; S-544; NAS 1.60:2475) Avail: NTIS HC  
A03/MF A01 CSCL 20A

ACOUSTIC MEASUREMENT, COLUMBIA (ORBITER), REENTRY EFFECTS, SONIC BOOMS

**N85-30767\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EFFECTS OF PROPELLER ROTATION DIRECTION ON AIRPLANE INTERIOR NOISE LEVELS**

C. M. WILLIS, W. H. MAYES, and E. F. DANIELS Washington Jul. 1985 34 p refs

(NASA-TP-2444; L-15892; NAS 1.60:2444) Avail: NTIS HC  
A03/MF A01 CSCL 20A

AIRCRAFT COMPARTMENTS, AIRCRAFT NOISE, NOISE REDUCTION, PROPELLER BLADES, TURBOPROP AIRCRAFT

**N86-12007\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**NUMERICAL TECHNIQUES IN ACOUSTICS**

K. J. BAUMEISTER, comp. Oct. 1985 35 p refs Meeting held in Miami Beach, Fla., 17-21 Nov. 1985; sponsored by the ASME

(NASA-CP-2404; E-2758; NAS 1.55:2404) Avail: NTIS HC  
A03/MF A01 CSCL 20A

ACOUSTICS, BOUNDARY INTEGRAL METHOD, FINITE ELEMENT METHOD, NOISE (SOUND), NOISE PREDICTION, SOUND PRESSURE, VIBRATION

**N86-13056\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A METHOD FOR DETERMINING ACOUSTIC-LINER ADMITTANCE IN DUCTS WITH SHEARED FLOW IN TWO-CROSS-SECTIONAL DIRECTIONS**

W. R. WATSON Oct. 1985 40 p refs  
(NASA-TP-2518; L-15997; NAS 1.60:2518) Avail: NTIS HC  
A03/MF A01 CSCL 20A

ACOUSTIC DUCTS, ACOUSTIC IMPEDANCE, ACOUSTIC MEASUREMENT, ELECTRICAL IMPEDANCE, FLOW DISTRIBUTION, GRAZING FLOW, IMPEDANCE PROBES, LININGS, RETARDING, SHEAR FLOW

**N86-16040\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYTICAL STUDY OF ACOUSTIC RESPONSE OF A SEMIREVERBERANT ENCLOSURE WITH APPLICATION TO ACTIVE NOISE CONTROL**

T. L. PARROTT, D. B. SCHEIN (George Washington Univ., Hampton, Va.), and D. GRIDLEY (Naval Avionics Center, Indianapolis, Ind.) Dec. 1985 48 p refs (NASA-TP-2472; L-15944; NAS 1.60:2472) Avail: NTIS HC A03/MF A01 CSCL 20A

MODAL RESPONSE, NOISE PROPAGATION, NOISE REDUCTION, REVERBERATION

**N86-16041\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**LOCATION OF NOISE SOURCES USING A PHASE-SLOPE METHOD**

R. DELOACH and J. S. PREISSER Nov. 1985 49 p refs (NASA-TP-2505; L-15793; NAS 1.60:2505) Avail: NTIS HC A03/MF A01 CSCL 20A

ACOUSTIC MEASUREMENT, BROADBAND, GRADIENTS, MICROPHONES, NOISE GENERATORS, POSITION (LOCATION)

**N86-21280\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**NEW TECHNIQUES FOR EXPERIMENTAL GENERATION OF TWO-DIMENSIONAL BLADE-VORTEX INTERACTION AT LOW REYNOLDS NUMBERS**

E. BOOTH, JR. and J. C. YU Mar. 1986 27 p refs (NASA-TP-2551; L-15981; NAS 1.60:2551) Avail: NTIS HC A03/MF A01 CSCL 20A

FLOW VISUALIZATION, TWO DIMENSIONAL FLOW, UNSTEADY FLOW, VORTEX GENERATORS

**N86-24391\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INTRODUCTION TO TIME SERIES ANALYSIS**

J. C. HARDIN Mar. 1986 168 p refs (NASA-RP-1145; L-15958; NAS 1.61:1145) Avail: NTIS HC A08/MF A01 CSCL 20A

The field of time series analysis is explored from its logical foundations to the most modern data analysis techniques. The presentation is developed, as far as possible, for continuous data, so that the inevitable use of discrete mathematics is postponed until the reader has gained some familiarity with the concepts. The monograph seeks to provide the reader with both the theoretical overview and the practical details necessary to correctly apply the full range of these powerful techniques. In addition, the last chapter introduces many specialized areas where research is currently in progress.

Author

**N86-24393\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CONSIDERATION OF SOME FACTORS AFFECTING LOW-FREQUENCY FUSELAGE NOISE TRANSMISSION FOR PROPELLER AIRCRAFT**

J. S. MIXSON and L. A. ROUSSOS Apr. 1986 28 p refs (NASA-TP-2552; L-14994; NAS 1.60:2552) Avail: NTIS HC A03/MF A01 CSCL 20A

AERODYNAMIC NOISE, AIRCRAFT NOISE, NOISE PROPAGATION, NOISE SPECTRA, PLANE WAVES, SOUND WAVES

**N86-26162\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EXPERIMENTAL STUDY OF THE EFFECTS OF INSTALLATION ON SINGLE-AND COUNTER-ROTATION PROPELLER NOISE**

P. J. W. BLOCK Apr. 1986 33 p refs Original contains color illustrations (NASA-TP-2541; L-16046; NAS 1.60:2541) Avail: NTIS HC A03/MF A01 CSCL 20A

CONTRAROTATING PROPELLERS, NOISE (SOUND), NOISE

MEASUREMENT, PROPELLER SLIPSTREAMS, PYLONS, UNSTEADY FLOW

**N86-27043\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**PRESSURE PROBE AND HOT-FILM PROBE RESPONSES TO ACOUSTIC EXCITATION IN MEAN FLOW**

T. L. PARROTT and M. G. JONES (PRC Kentron, Inc., Hampton, Va.) Jun. 1986 56 p refs (NASA-TP-2581; L-16079; NAS 1.60:2581) Avail: NTIS HC A04/MF A01 CSCL 20A

ACOUSTIC EXCITATION, ACOUSTIC MEASUREMENT, DUCTED FLOW, HOT-FILM ANEMOMETERS, PRESSURE OSCILLATIONS, PRESSURE SENSORS, SUBSONIC FLOW

**N86-31337\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ACOUSTIC TREATMENT OF THE NASA LANGLEY 4- BY 7-METER TUNNEL: A FEASIBILITY STUDY**

J. C. YU and A. L. ABRAHAMSON (Comtek, Grafton, Va.) Aug. 1986 38 p (NASA-TP-2563; L-16037; NAS 1.60:2563) Avail: NTIS HC A03/MF A01 CSCL 20A

ACOUSTIC PROPERTIES, AEROACOUSTICS, AIRCRAFT NOISE, ANECHOIC CHAMBERS, FEASIBILITY ANALYSIS, HELICOPTERS, WIND TUNNELS

**N86-31341\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DIRECTIVITY AND TRENDS OF NOISE GENERATED BY A PROPELLER IN A WAKE**

P. J. W. BLOCK and C. L. GENTRY, JR. Sep. 1986 63 p (NASA-TP-2609; L-16131; NAS 1.60:2609) Avail: NTIS HC A04/MF A01 CSCL 20A

ACOUSTIC MEASUREMENT, AERODYNAMIC NOISE, AIRCRAFT WAKES, DIRECTIVITY, PROPELLERS

## 72

### ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure, electron properties, and molecular spectra.

**N78-20927\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE OPTICAL ABSORPTION OF TRIATOMIC CARBON C3 FOR THE WAVELENGTH RANGE 260 TO 560 NM**

J. J. JONES Mar. 1978 61 p refs (NASA-TP-1141; L-11871) Avail: NTIS HC A04/MF A01 CSCL 20H

ABSORPTION CROSS SECTIONS, CARBON, ELECTROMAGNETIC ABSORPTION, TRIATOMIC MOLECULES

**N79-25861\*#** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

**ELECTRICAL ENCLOSURE HYDROGEN INTRUSION STUDY**

P. J. WELCH and J. N. YANTSIOS Jun. 1979 34 p refs (NASA-TP-1461; KSC-TR-72-1) Avail: NTIS HC A03/MF A01 CSCL 21B

CAPE KENNEDY LAUNCH COMPLEX, ELECTRIC EQUIPMENT, ENCLOSURES, GASEOUS DIFFUSION, HYDROGEN, PURGING

**N80-26125\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**REVIEW OF SPECTROSCOPIC DATA FOR MEASUREMENTS OF STRATOSPHERIC SPECIES**

A. GOLDMAN, ed. (Denver Univ.) and J. M. HOELL, JR., ed. Jun. 1980 34 p Workshop held at Hampton, Va., 29-30 Oct. 1979

(NASA-CP-2136; L-13768) Avail: NTIS HC A03/MF A01 CSCL 20H

ATMOSPHERIC COMPOSITION, GAS COMPOSITION, MOLECULAR SPECTROSCOPY

**N82-15853\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ATLAS OF ABSORPTION LINES FROM 0 TO 17 900 CM(-1)**

J. H. PARK, L. S. ROTHMAN (AFGL), C. P. RINSLAND (Coll. of William and Mary, Williamsburg, Va.), M. A. H. SMITH, D. J. RICHARDSON (Systems and Applied Sciences Corp., Hampton, Va.), and J. C. LARSEN (Systems and Applied Sciences Corp., Hampton, Va.) Washington Dec. 1981 209 p refs (NASA-RP-1084; L-14720) Avail: NTIS HC A10/MF A01 CSCL 07D

Plots of absorption line strength versus line position for wavenumbers from 0 to 17,900 cm(-1) are shown for 20 atmospheric gases (H<sub>2</sub>O, CO<sub>2</sub>, O<sub>3</sub>, N<sub>2</sub>O, CO, CH<sub>4</sub>, O<sub>2</sub>, NO, SO<sub>2</sub>, NO<sub>2</sub>, NH<sub>3</sub>, HNO<sub>3</sub>, OH, HF, HCl, HBr, HI, ClO, OCS, H<sub>2</sub>CO). Also shown are similar plots of lower-state energy values for adsorption lines for the strongly adsorbing atmospheric gases (H<sub>2</sub>O, CO<sub>2</sub>, O<sub>3</sub>, and CH<sub>4</sub>) for wavenumbers from 0 to 5000 cm(-1). M.G.

**N83-27809\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**RATE PROCESSES IN GAS PHASE**

C. F. HANSEN May 1983 263 p refs

(NASA-RP-1090; A-8817; NAS 1.61:1090) Avail: NTIS HC A12/MF A01 CSCL 20H

Reaction-rate theory and experiment are given a critical review from the engineers' point of view. Rates of heavy-particle, collision-induced reaction in gas phase are formulated in terms of the cross sections and activation energies for reaction. The effect of cross section function shape and of excited state contributions to reaction both cause the slope of Arrhenius plots to differ from the true activation energy, except at low temperature. The master equations for chemically reacting gases are introduced, and dissociation and ionization reactions are shown to proceed primarily from excited states about kT from the dissociation or ionization limit. Collision-induced vibration, vibration-rotation, and pure rotation transitions are treated, including three-dimensional effects and conservation of energy, which have usually been ignored. The quantum theory of transitions at potential surface crossing is derived, and results are found to be in fair agreement with experiment in spite of some questionable approximations involved. Author

**N86-13064\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**REVIEW OF SPECTROSCOPIC PARAMETERS FOR UPPER ATMOSPHERIC MEASUREMENTS**

M. A. H. SMITH, ed. Oct. 1985 28 p refs Presented at the Spectroscopic Parameters Workshop, Hampton, Va., 17-19 Oct. 1984

(NASA-CP-2396; L-16022; NAS 1.55:2396) Avail: NTIS HC A03/MF A01 CSCL 04A

CONFERENCES, MOLECULAR SPECTROSCOPY, REMOTE SENSING, UPPER ATMOSPHERE

## NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

**N81-27899\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**OPTICAL-MODEL ABRASION CROSS SECTIONS FOR HIGH-ENERGY HEAVY IONS**

L. W. TOWNSEND Jul. 1981 18 p refs

(NASA-TP-1893; L-14554) Avail: NTIS HC A02/MF A01 CSCL 20H

EIKONAL EQUATION, GLAUBER THEORY, HEAVY IONS, SCATTERING CROSS SECTIONS

**N82-23003\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HARMONIC WELL MATTER DENSITIES AND PAULI CORRELATION EFFECTS IN HEAVY-ION COLLISIONS**

L. W. TOWNSEND Apr. 1982 31 p refs

(NASA-TP-2003; L-15105; NAS 1.60:2003) Avail: NTIS HC A03/MF A01 CSCL 20H

HARMONIC MOTION, HEAVY IONS, ION DENSITY (CONCENTRATION), IONIC COLLISIONS, PAULI EXCLUSION PRINCIPLE

**N83-23140\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HEAVY-ION TOTAL AND ABSORPTION CROSS SECTIONS ABOVE 25 MEV/NUCLEON**

L. W. TOWNSEND, J. W. WILSON, and H. B. BIDASARIA (Old Dominion Univ.) Apr. 1983 44 p refs

(NASA-TP-2138; L-15566; NAS 1.60:2138) Avail: NTIS HC A03/MF A01 CSCL 20H

ABSORPTION CROSS SECTIONS, HEAVY IONS, NUCLEAR INTERACTIONS, NUCLEON-NUCLEON SCATTERING

**N84-13978\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A SIMPLE MODEL OF SPACE RADIATION DAMAGE IN GAAS SOLAR CELLS**

J. W. WILSON, J. J. STITH (Virginia State Univ., Petersburg), and L. V. STOCK (Old Dominion Univ., Norfolk, Va.) Dec. 1983 31 p refs

(NASA-TP-2242; L-15689; NAS 1.60:2242) Avail: NTIS HC A03/MF A01 CSCL 20H

GALLIUM ARSENIDES, RADIATION DAMAGE, SEMICONDUCTOR JUNCTIONS, SOLAR CELLS

**N84-22396\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**AN ABRASION-ABLATION MODEL DESCRIPTION OF GALACTIC HEAVY-ION FRAGMENTATION**

L. W. TOWNSEND, J. W. WILSON, J. W. NORBURY (Old Dominion Univ.), and H. B. BIDASARIA (Old Dominion Univ.) Apr. 1984 20 p refs

(NASA-TP-2305; L-15763; NAS 1.60:2305) Avail: NTIS HC A02/MF A01 CSCL 03B

ABLATION, ABRASION, FRAGMENTATION, GALACTIC RADIATION, HEAVY IONS, NUCLEAR INTERACTIONS, QUANTUM MECHANICS

**N84-26398\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**A STOCHASTIC MODEL FOR PHOTON NOISE INDUCED BY CHARGED PARTICLES IN MULTIPLIER PHOTOTUBES OF THE SPACE TELESCOPE FINE GUIDANCE SENSORS**

L. W. HOWELL and H. F. KENNEL Jun. 1984 67 p refs (NASA-TP-2337; NAS 1.60:2337) Avail: NTIS HC A04/MF A01 CSCL 03A

CERENKOV RADIATION, GUIDANCE SENSORS, SPACEBORNE TELESCOPES, SPACECRAFT CHARGING

**N85-17690\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**A T-MATRIX THEORY OF GALACTIC HEAVY-ION FRAGMENTATION**

J. W. NORBURY, L. W. TOWNSEND, and P. A. DEUTCHMAN Jan. 1985 29 p refs

(NASA-TP-2363; L-15833; NAS 1.60:2363) Avail: NTIS HC A03/MF A01 CSCL 03B

ABLATION, ABRASION, COSMIC RAYS, FRAGMENTATION, HEAVY IONS, MATRIX THEORY

**N85-27665\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**TABLES OF NUCLEAR CROSS SECTIONS FOR GALACTIC COSMIC RAYS: ABSORPTION CROSS SECTIONS**

L. W. TOWNSEND and J. W. WILSON May 1985 33 p refs (NASA-RP-1134; L-15891; NAS 1.61:1134) Avail: NTIS HC A03/MF A01 CSCL 03B

A simple but comprehensive theory of nuclear reactions is presented. Extensive tables of nucleon, deuteron, and heavy-ion absorption cross sections over a broad range of energies are generated for use in cosmic ray shielding studies. Numerous comparisons of the calculated values with available experimental data show agreement to within 3 percent for energies above 80 MeV/nucleon and within approximately 10 percent for energies as low as 30 MeV/nucleon. These tables represent the culmination of the development of the absorption cross section formalism and supersede the preliminary absorption cross sections published previously in NASA TN D-8107, NASA TP-2138, and NASA TM-84636. Author

**N86-21297\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SECOND QUANTIZATION TECHNIQUES IN THE SCATTERING OF NONIDENTICAL COMPOSITE BODIES**

J. W. NORBURY (Old Dominion Univ., Norfolk, Va.), L. W. TOWNSEND, and P. A. DEUTCHMAN (Idaho Univ., Moscow) Jan. 1986 18 p refs

(NASA-TP-2522; L-16016; NAS 1.60:2522) Avail: NTIS HC A02/MF A01 CSCL 30H

ANNIHILATION REACTIONS, ELASTIC SCATTERING, NUCLEON-NUCLEON INTERACTIONS

**N86-23388\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SYMMETRY CONSIDERATIONS IN THE SCATTERING OF IDENTICAL COMPOSITE BODIES**

J. W. NORBURY (Old Dominion Univ., Norfolk, Va.), L. W. TOWNSEND, and P. A. DEUTCHMAN (Idaho Univ., Moscow) 1986 19 p refs

(NASA-TP-2548; L-16035; NAS 1.60:2548) Avail: NTIS HC A02/MF A01 CSCL 20H

COMPOSITE MATERIALS, HOLES (ELECTRON DEFICIENCIES), MATHEMATICAL MODELS, PROJECTILES, TARGETS

**N86-30485\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**CROSS SECTION CALCULATIONS FOR SUBTHRESHOLD PION PRODUCTION IN PERIPHERAL HEAVY-ION COLLISIONS**

J. W. NORBURY (Old Dominion Univ., Norfolk, Va.), F. A. CUCINOTTA, P. A. DEUTCHMAN (Idaho Univ., Moscow), and L. W. TOWNSEND Aug. 1986 27 p

(NSF PHY-84-11009)

(NASA-TP-2600; L-16129; NAS 1.60:2600) Avail: NTIS HC A03/MF A01 CSCL 20H

CARBON 12, HEAVY IONS, NUCLEI (NUCLEAR PHYSICS), PARTICLE COLLISIONS, PIONS

## 74

### OPTICS

Includes light phenomena; and optical devices.

**N78-11812\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**PERFORMANCE ANALYSIS OF GRAZING INCIDENCE IMAGING SYSTEMS**

C. E. WINKLER and D. KORSCH (Teledyne Brown Engineering, Huntsville, Ala.) Nov. 1977 40 p refs

(NASA-TP-1088; M-241) Avail: NTIS HC A03/MF A01 CSCL 20F

ABERRATION, IMAGING TECHNIQUES, INCIDENCE, INCIDENT RADIATION, OPTICS, SYSTEM EFFECTIVENESS, X RAY TELESCOPES

**N78-12829\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ANALYSIS AND DESIGN OF A REFRACTIVE VIRTUAL IMAGE SYSTEM**

W. M. KAHLBAUM Washington Nov. 1977 76 p refs

(NASA-TP-1066; L-11678) Avail: NTIS HC A05/MF A01

CSCL 20F

FLIGHT SIMULATORS, IMAGE INTENSIFIERS, IMAGE TUBES, LENS DESIGN, VISUAL PERCEPTION

**N78-20948\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**OPTICAL AND HOLOGRAPHIC STORAGE PROPERTIES OF F3, CU, AND MG-DOPED LITHIUM NIOBATE**

M. E. BEATTY, III and B. D. MEREDITH Mar. 1978 18 p refs

(NASA-TP-1144; L-11964) Avail: NTIS HC A02/MF A01

CSCL 20F

DATA STORAGE, HOLOGRAPHY, LITHIUM NIOBATES, OPTICAL DATA PROCESSING

**N78-27906\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**INVESTIGATION OF LIGHT SCATTERING AS A TECHNIQUE FOR DETECTING DISCRETE SOOT PARTICLES IN A LUMINOUS FLAME**

Jul. 1978 21 p refs

(NASA-TP-1235; L-12130) Avail: NTIS HC A02/MF A01

CSCL 20F

FLAMES, LIGHT SCATTERING, OPTICAL MEASURING INSTRUMENTS, SOOT

**N81-13739\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SPATIAL FREQUENCY RESPONSE OF AN OPTICAL HETERODYNE RECEIVER**

D. M. ROBINSON and C. L. FALES Dec. 1980 24 p refs (NASA-TP-1763; L-14099) Avail: NTIS HC A02/MF A01 CSCL 20F

IMAGING TECHNIQUES, MODULATION TRANSFER FUNCTION, OPTICAL HETERODYNING, OPTICAL TRANSFER FUNCTION

**N82-15894\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**OPTICAL INFORMATION PROCESSING FOR AEROSPACE APPLICATIONS**

Dec. 1981 347 p refs Conf. held in Hampton, Va., 18-19 Aug. 1981 (NASA-CP-2207; L-15018) Avail: NTIS HC A15/MF A01 CSCL 20F

AIRCRAFT EQUIPMENT, CONFERENCES, INTEGRATED OPTICS, OPTICAL DATA PROCESSING, OPTICAL WAVEGUIDES

**N83-13979\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LARGE-APERTURE INTERFEROMETER USING LOCAL REFERENCE BEAM**

W. L. HOWES Nov. 1982 20 p refs (NASA-TP-2060; E-1153; NAS 1.60:2060) Avail: NTIS HC A02/MF A01 CSCL 20F

INTERFEROMETERS, LENSES, PARABOLOID MIRRORS

**N83-27846\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**DEVELOPMENT OF A SIMPLIFIED OPTICAL TECHNIQUE FOR THE SIMULTANEOUS MEASUREMENT OF PARTICLE SIZE DISTRIBUTION AND VELOCITY**

J. L. SMITH Jun. 1983 33 p refs (NASA-TP-2185; M-413; NAS 1.60:2185) Avail: NTIS HC A03/MF A01 CSCL 20F

FLUIDIZED BED PROCESSORS, LASER ANEMOMETERS, OPTICAL MEASURING INSTRUMENTS, PARTICLE SIZE DISTRIBUTION

**N84-22402\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**OPTICAL INFORMATION PROCESSING FOR AEROSPACE APPLICATIONS 2**

R. L. STERMER, comp. Washington Mar. 1984 261 p refs Conf. held in Hampton, Va., 30-31 Aug. 1983 (NASA-CP-2302; L-15754; NAS 1.55:2302) Avail: NTIS HC A12/MF A01 CSCL 20F

AEROSPACE SCIENCES, CIRCUITS, CONFERENCES, INFORMATION SYSTEMS, MATERIALS SCIENCE, OPTICAL DATA PROCESSING, SIGNAL GENERATORS

**N86-17140\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**SINGLE SCATTERING FROM NONSPHERICAL CHEBYSHEV PARTICLES: A COMPENDIUM OF CALCULATIONS**

W. J. WISCOMBE and A. MUGNAI (Colorado State Univ., Fort Collins) Jan. 1986 282 p refs (NASA-RP-1157; REPT-613; NAS 1.61:1157) Avail: NTIS HC A13/MF A01 CSCL 20F

A large set of exact calculations of the scattering from a class of nonspherical particles known as Chebyshev particles has been performed. Phase function and degree of polarization in random orientation, and parallel and perpendicular intensities in fixed orientations, are plotted for a variety of particles shapes and sizes. The intention is to furnish a data base against which both experimental data, and the predictions of approximate methods, can be tested. The calculations are performed with the widely-used Extended Boundary Condition Method. An extensive discussion of

this method is given, including much material that is not easily available elsewhere (especially the analysis of its convergence properties). An extensive review is also given of all extant methods for nonspherical scattering calculations, as well as of the available pool of experimental data. Author

**N86-22390\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**OPTICAL ELEMENTS FORMED BY COMPRESSED GASES: ANALYSIS AND POTENTIAL APPLICATIONS**

W. L. HOWES 1986 24 p refs (NASA-TP-2555; E-2561; NAS 1.60:2555) Avail: NTIS HC A02/MF A01 CSCL 20F

FLOW VISUALIZATION, GAS DYNAMICS, INTERFEROMETERS, LENSES, SCHLIEREN PHOTOGRAPHY

## 75

## PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

**N78-20959\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**TEMPERATURE DISTRIBUTIONS OF A CESIUM-SEEDED HYDROGEN-OXYGEN SUPERSONIC FREE JET**

S. Y. WANG and J. M. SMITH Feb. 1978 24 p refs (NASA-TP-1162; E-9267) Avail: NTIS HC A02/MF A01 CSCL 20I

EMISSION SPECTRA, PLASMA JETS, TEMPERATURE DISTRIBUTION

**N78-21922\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**EFFECT OF ANODE-CATHODE GEOMETRY ON PERFORMANCE OF THE HIP-1 HOT ION PLASMA**

M. R. LAUVER Apr. 1978 25 p refs (NASA-TP-1201; E-9386) Avail: NTIS HC A02/MF A01 CSCL 20I

ANODES, HOLLOW CATHODES, ION TEMPERATURE, MAGNETIC MIRRORS, PLASMA ELECTRODES

**N78-26927\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FLUCTUATION SPECTRA IN THE NASA LEWIS BUMPY-TORUS PLASMA**

C. M. SINGH, W. M. KRAWCZONEK, J. R. ROTH, J. Y. HONG, and E. J. POWERS Jun. 1978 31 p refs (NASA-TP-1257; E-8696) Avail: NTIS HC A03/MF A01 CSCL 20I

MAGNETOHYDRODYNAMIC STABILITY, PLASMA DIAGNOSTICS, PLASMA DIFFUSION, SPECTRUM ANALYSIS, TOROIDAL PLASMAS

**N78-30944\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LOW-FREQUENCY FLUCTUATION SPECTRA AND ASSOCIATED PARTICLE TRANSPORT IN THE NASA LEWIS BUMPY-TORUS PLASMA**

C. M. SINGH, W. M. KRAWCZONEK, J. R. ROTH, J. Y. HONG (Texas Univ., Austin), Y. C. KIM (Texas Univ., Austin), and E. J. POWERS (Texas Univ., Austin) Aug. 1978 53 p refs (NASA-TP-1258; E-9565) Avail: NTIS HC A04/MF A01 CSCL 20I

FLUCTUATION THEORY, PLASMA DIAGNOSTICS, PLASMA DIFFUSION, RADIAL DISTRIBUTION, TRANSPORT THEORY

## THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics.

**N79-13901\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.  
**AEROTHERMAL TESTS OF A HEAT-PIPE-COOLED LEADING EDGE AT MACH 7**

C. J. CAMARDA Nov. 1978 39 p refs  
 (NASA-TP-1320; L-12302) Avail: NTIS HC A03/MF A01  
 CSCL 20N

AEROTHERMODYNAMICS, COOLING, HEAT PIPES, HYPERSONIC HEAT TRANSFER, LEADING EDGES, SPACE SHUTTLE ORBITERS

**N82-32186\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMODYNAMIC AND TRANSPORT COMBUSTION PROPERTIES OF HYDROCARBONS WITH AIR. PART 1: PROPERTIES IN SI UNITS**

S. GORDON Jul. 1982 397 p refs  
 (NASA-TP-1906; E-946; NAS 1.60:1906) Avail: NTIS HC A17/MF A01 CSCL 20M

COMBUSTION PHYSICS, HYDROCARBON COMBUSTION, THERMODYNAMIC PROPERTIES, TRANSPORT PROPERTIES

**N82-32187\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMODYNAMIC AND TRANSPORT COMBUSTION PROPERTIES OF HYDROCARBONS WITH AIR. PART 2: COMPOSITIONS CORRESPONDING TO KELVIN TEMPERATURE SCHEDULES IN PART 1**

S. GORDON Jul. 1982 281 p refs  
 (NASA-TP-1907; E-947; NAS 1.60:1907) Avail: NTIS HC A13/MF A01 CSCL 20M

CHEMICAL COMPOSITION, COMBUSTION PHYSICS, HYDROCARBON COMBUSTION, THERMODYNAMIC PROPERTIES, TRANSPORT PROPERTIES

**N82-32188\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMODYNAMIC AND TRANSPORT COMBUSTION PROPERTIES OF HYDROCARBONS WITH AIR. PART 3: PROPERTIES IN US CUSTOMARY UNITS**

S. GORDON Jul. 1982 362 p refs  
 (NASA-TP-1908; E-948; NAS 1.60:1908) Avail: NTIS HC A16/MF A01 CSCL 20M

COMBUSTION PHYSICS, HYDROCARBON COMBUSTION, THERMODYNAMIC PROPERTIES, TRANSPORT PROPERTIES

**N82-32189\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**THERMODYNAMIC AND TRANSPORT COMBUSTION PROPERTIES OF HYDROCARBONS WITH AIR. PART 4: COMPOSITIONS CORRESPONDING TO RANKINE TEMPERATURE SCHEDULES IN PART 3**

S. GORDON Jul. 1982 281 p refs  
 (NASA-TP-1909; E-949; NAS 1.60:1909) Avail: NTIS HC A18/MF A01 CSCL 20M

CHEMICAL COMPOSITION, COMBUSTION PHYSICS, HYDROCARBON COMBUSTION, THERMODYNAMIC PROPERTIES, TRANSPORT PROPERTIES

**N79-19867\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**ION CONFINEMENT AND TRANSPORT IN A TOROIDAL PLASMA WITH EXTERNALLY IMPOSED RADIAL ELECTRIC FIELDS**

J. R. ROTH, W. M. KRAWCZONEK, E. J. POWERS (Texas Univ. Austin), Y. C. KIM (Texas Univ., Austin), and H. Y. HONG (Texas Univ., Austin) Mar. 1979 86 p refs  
 (NASA-TP-1411; E-9754) Avail: NTIS HC A05/MF A01 CSCL 20I

ELECTRIC FIELDS, IONIC MOBILITY, PLASMA CONTROL, TOROIDAL PLASMAS, TRANSPORT PROPERTIES

**N84-25458\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**MAGNETOHYDRODYNAMIC POWER GENERATION**

J. L. SMITH May 1984 36 p refs  
 (NASA-TP-2331; NAS 1.60:2331) Avail: NTIS HC A03/MF A01 CSCL 20I

COMBUSTION, ELECTRIC FIELDS, FLOW DISTRIBUTION, LIQUID METALS, MAGNETIC FIELDS, MAGNETOHYDRODYNAMICS

## SOLID-STATE PHYSICS

Includes superconductivity.

**N79-13886\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**IONIZED DOPANT CONCENTRATIONS AT THE HEAVILY DOPED SURFACE OF A SILICON SOLAR CELL**

I. WEINBERG, J. D. BRODER, G. A. MAZARIS, JR., and L. HSU Dec. 1978 19 p refs  
 (NSG-3014)

(NASA-TP-1347; E-9629) Avail: NTIS HC A02/MF A01 CSCL 10B

ADDITIVES, CONCENTRATION (COMPOSITION), METAL OXIDE SEMICONDUCTORS, SOLAR CELLS

**N83-21991\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**A STUDY OF PRODUCTION OF MISIBILITY GAP ALLOYS WITH CONTROLLED STRUCTURES**

R. A. PARR, M. H. JOHNSTON, J. A. BURKA, J. H. DAVIS, and J. A. LEE Mar. 1983 43 p refs  
 (NASA-TP-2144; NAS 1.60:2144) Avail: NTIS HC A03/MF A01 CSCL 20L

ALLOYS, DIRECTIONAL SOLIDIFICATION (CRYSTALS), METAL MATRIX COMPOSITES, SUPERCONDUCTIVITY

**N85-24961\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**MONTE CARLO LATTICE MODELS FOR ADSORBED POLYMER CONFORMATION**

B. S. GOOD May 1985 12 p refs  
 (NASA-TP-2453; E-2400; NAS 1.60:2453) Avail: NTIS HC A02/MF A01 CSCL 20L

ADHESION, CRYSTAL LATTICES, METALS, MONTE CARLO METHOD, POLYMERIC FILMS, RANDOM WALK, SURFACE PROPERTIES

**N83-23188\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**A CLASS OF NONIDEAL SOLUTIONS. 2: APPLICATION TO EXPERIMENTAL DATA**

F. J. ZELENIN and L. F. DONOVAN Apr. 1983 55 p refs (NASA-TP-1930; E-020; NAS 1.60:1930) Avail: NTIS HC A04/MF A01 CSCL 20M

ELECTROLYTES, FUNCTIONS (MATHEMATICS), GIBBS FREE ENERGY, LEAST SQUARES METHOD, SOLUTIONS, THERMODYNAMIC PROPERTIES

**N83-23189\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**A CLASS OF NONIDEAL SOLUTIONS. 1: DEFINITION AND PROPERTIES**

F. J. ZELENIN Apr. 1983 43 p refs (NASA-TP-1929; E-021; NAS 1.60:1929) Avail: NTIS HC A03/MF A01 CSCL 20M

ENTHALPY, HEAT OF SOLUTION, PHYSICAL CHEMISTRY, SOLUTIONS, THERMODYNAMICS

## 80

## SOCIAL SCIENCES (GENERAL)

Includes educational matters.

**N82-14955\*#** National Aeronautics and Space Administration, Washington, D.C.

**ORDERS OF MAGNITUDE: A HISTORY OF NACA AND NASA, 1915 - 1980**

F. W. ANDERSON, JR. 1981 113 p refs (NASA-SP-4403) Avail: NTIS MF A01; HC SOD \$4.75 CSCL 05D

The history of NACA and NASA from 1915 to 1980 is narrated. The impact of two world wars on aeronautics is reviewed. Research activity before and during World War II is presented. Postwar exploitation of new technologies is summarized. The creation of NASA and a comprehensive space program is discussed. Long range planning for a lunar mission is described. The Gemini project is reviewed. The Apollo project and side effects including NASA's university and technology transfer programs are presented. Numerous scientific and application satellite projects are reviewed. The impact of budget reductions is explained. The value of space exploration is emphasized. Development of the Space Shuttle is reported. N.W.

**N85-24994\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**THE IMPACT OF SCIENCE ON SOCIETY**

J. BURKE, J. BERGMAN, and I. ASIMOV 1985 98 p Lectures held in Williamsburg, Va., 1983 (NASA-SP-482; L-15858; NAS 1.21:482; LC-84-14159) Avail: NTIS HC A05/MF A01; SOD HC \$4.50 as SN033-000-00943-7 CSCL 05K

Four speeches delivered as part of a public lecture series to assess the impact of science on society are presented. The computerization of society, space exploration and habitation, the mechanisms of technological change, and cultural responses are addressed. For individual titles see N85-24995 through N85-24998.

## 81

## ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

**N79-16709\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**A CRITICAL REVIEW OF THE LIFE SCIENCES PROJECT MANAGEMENT AT AMES RESEARCH CENTER FOR THE SPACELAB MISSION DEVELOPMENT TEST 3**

R. L. HELMREICH (Texas Univ., Austin), J. M. WILHELM (Texas Univ., Austin), T. A. TANNER (California State Univ., Hayward), J. E. SIEBER (Texas Univ., Austin), and S. F. BURGENBAUCH Jan. 1979 66 p refs (NSG-2065; NCA2-OR290-705) (NASA-TP-1364; A-7536) Avail: NTIS HC A04/MF A01 CSCL 05A

PROJECT MANAGEMENT, SPACE MISSIONS, SPACELAB

**N79-19912\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**MANAGEMENT SYSTEM, ORGANIZATIONAL CLIMATE AND PERFORMANCE RELATIONSHIPS**

B. D. DAVIS Feb. 1979 38 p refs (NASA-TP-1417; M-281) Avail: NTIS HC A03/MF A01 CSCL 05A

DECISION MAKING, MANAGEMENT SYSTEMS, PSYCHOLOGICAL FACTORS

**N83-18551\*#** National Aeronautics and Space Administration, Washington, D.C.

**MANAGING NASA IN THE APOLLO ERA**

A. S. LEVINE 1982 359 p refs (NASA-SP-4102; NAS 1.21:4102) Avail: NTIS HC A16/MF A01 CSCL 05A

The administration and organization are described and analyzed. Policies on manpower and the budgetary process for contracting for research development, the structure of NASA-DOD relations, and program planning are discussed. S.L.

**N85-16665\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE MANAGEMENT OF RESEARCH INSTITUTIONS: A LOOK AT GOVERNMENT LABORATORIES**

H. MARK and A. LEVINE 1984 311 p refs (NASA-SP-481; NAS 1.21:481) Avail: NTIS MF A01; SOD HC \$9.00 as SN-033-000-00937-2 CSCL 05A

Technology development; project management; employment patterns; research productivity; legal status of support services; functions of senior executives; the role of the sponsoring agency; research diversification; obstacles to technical innovation; organizational structures; and personnel management are addressed. B.G.

**N86-27108\*#** National Aeronautics and Space Administration, Washington, D.C.

**MANAGEMENT: A BIBLIOGRAPHY FOR NASA MANAGERS**

Apr. 1986 169 p (NASA-SP-7500(20); NAS 1.21:7500(20)) Avail: NTIS HC A08 CSCL 05A

This bibliography lists 707 reports, articles and other documents introduced into the NASA scientific and technology information system in 1985. Items are selected and grouped according to their usefulness to the manager as manager. Citations are grouped into ten subject categories: human factors and personnel issues; management theory and techniques; industrial management and manufacturing; robotics and expert systems; computers and information management; research and development; economics, costs, and markets; logistics and operations management; reliability and quality control; and legality, legislation, and policy. Author



## DOCUMENTATION AND INFORMATION SCIENCE

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography.

**N78-12895\*** # National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

## BIBLIOGRAPHY OF SUPERSONIC CRUISE AIRCRAFT RESEARCH (SCAR)

S. HOFFMAN Nov. 1977 102 p Supersedes NASA-TM-X-73950; N76-34039

(NASA-RP-1003; L-11603; NASA-TM-X-73950) Avail: NTIS HC A06/MF A01 CSCL 05B

This bibliography documents publications of the supersonic cruise aircraft research (SCAR) program that were generated during the first 5 years of effort. The reports are arranged according to systems studies and five SCAR disciplines: propulsion, stratospheric emissions impact, structures and materials, aerodynamic performance, and stability and control. The specific objectives of each discipline are summarized. Annotation is included for all NASA inhouse and low-number contractor reports. There are 444 papers and articles included. Author

**N79-13914\*** National Aeronautics and Space Administration, Washington, D.C.

## NASA GUIDELINES ON REPORT LITERATURE

1978 27 p refs

(NASA-SP-7200) Avail: NTIS HC A03 CSCL 05B

NASA seeks for inclusion in its Scientific and Technical Information System research reports, conference proceedings, meeting papers, monographs, and doctoral and post graduate theses which relate to the NASA mission and objectives. Topics of interest to NASA are presented. G.Y.

**N82-14960\*** # National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

## TECHNICAL COMMUNICATION: PERSPECTIVES FOR THE EIGHTIES, PART 1. PROCEEDINGS OF THE TECHNICAL COMMUNICATIONS SESSIONS AT THE 32ND ANNUAL MEETING OF THE CONFERENCE ON COLLEGE COMPOSITION AND COMMUNICATION

J. C. MATHES, comp. (Michigan Univ., Ann Arbor) and T. E. PINELLI, comp. Dec. 1981 307 p refs Conf. held in Dallas, 26-28 Mar. 1981

(NASA-CP-2203-PT-1; L-14899-PT-1) Avail: NTIS HC A14/MF A01 CSCL 05B

COMMUNICATION THEORY, CONFERENCES, EDUCATION, GRAPHIC ARTS, LEARNING THEORY, TEACHING MACHINES, TRAINING DEVICES, VERBAL COMMUNICATION

**N82-15986\*** # National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

## TECHNICAL COMMUNICATION. PERSPECTIVES FOR THE EIGHTIES, PART 2

J. C. MATHES, comp. (Michigan Univ., Ann Arbor) and T. E. PINELLI, comp. Dec. 1981 316 p refs Papers presented at the 32nd Ann. Meeting of the Conf. on Coll. Composition and Commun., Dallas, 26-28 Mar. 1981 2 Vol.

(NASA-CP-2203-PT-2; L-14899-PT-2) Avail: NTIS HC A14/MF A01 CSCL 05B

COMMUNICATION THEORY, CONFERENCES, EDUCATION, STANDARDS, TECHNICAL WRITING

**N83-18559\*** # National Aeronautics and Space Administration, Washington, D.C.

## NASA ADMINISTRATIVE DATA BASE MANAGEMENT SYSTEMS

Jan. 1983 285 p refs Conf. held in Pasadena, Calif., 26-27 May 1982

(NASA-CP-2254; NAS 1.55:2254) Avail: NTIS HC A13/MF A01 CSCL 05B

CONFERENCES, DATA BASE MANAGEMENT SYSTEMS, DATA BASES, DATA MANAGEMENT, INFORMATION RETRIEVAL, INFORMATION SYSTEMS

**N83-22010\*** National Aeronautics and Space Administration, Washington, D.C.

## DATA BASES AND DATA BASE SYSTEMS RELATED TO NASA'S AEROSPACE PROGRAM: A BIBLIOGRAPHY WITH INDEXES

1983 172 p

(NASA-SP-7048; NAS 1.21:7048) Avail: NTIS HC \$17.50 CSCL 05B

This bibliography lists 641 reports, articles, and other documents introduced into the NASA scientific and technical information system during the period January 1, 1981 through June 30, 1982. The directory was compiled to assist in the location of numerical and factual data bases and data base handling and management systems. B.G.

**N83-32671\*** National Aeronautics and Space Administration, Washington, D.C.

## NASA PUBLICATIONS GUIDE

1982 16 p refs

(NASA-SP-7047; NAS 1.12/6:7047; NAS 1.21:7047) Avail: NTIS HC A02 CSCL 05B

The publication programs and management policies of NASA are described and the details that authors and publication specialists need to know to carry out the agency's mission of disseminating the scientific and technical information derived from its activities are highlighted. Topics covered include the various kinds of NASA formal publications; selection of publication medium; printing and distribution; and requirements concerning style and format standards, copyright transfers, the cover, color, and foldouts. The sections of a report are delineated and editorial and page make-up responsibilities are also discussed. A.R.H.

**N83-33792\*** # National Aeronautics and Space Administration, Washington, D.C.

## RECORDS OF ACHIEVEMENT: NASA SPECIAL PUBLICATIONS

1983 141 p Original contains color illustrations

(NASA-SP-470; NAS 1.21:470) Avail: NTIS and NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 05B

This annotated bibliography cites all NASA Special Publications issued since 1961. The Reference Publications and Conference Publications are included. Entries are arranged by SP number. The entries are grouped in eight categories: general, handbooks and data compilations, histories and chronologies, technology utilization, management evaluation and analysis standards, bibliographies, space vehicle design criteria, and specifications. The Reference Publications and Conference Publications are listed separately according to RP and CP number. Approximately 1400 entries are listed. Each entry includes the title, author, NASA accession number, NASA SP, RP, or CP number, original sales source, and publication date. An index of the SP, RP, and CP numbers according to NASA subject category is provided. Highlights of NASA's achievements since 1958 are included as a tribute to NASA's 25th anniversary. A.R.H.

**N84-21403\*#** National Aeronautics and Space Administration, Washington, D.C.

**NASA ADMINISTRATIVE DATA BASE MANAGEMENT SYSTEMS, 1983**

J. D. RADOSEVICH, ed. Apr. 1984 174 p refs Conf. held in Greenbelt, Md., 25-26 May 1983  
(NASA-CP-2304; NAS 1.55:2304; REPT-2) Avail: NTIS HC A08/MF A01 CSCL 05B

CONFERENCES, DATA BASE MANAGEMENT SYSTEMS, MANAGEMENT INFORMATION SYSTEMS, NASA PROGRAMS, ON-LINE SYSTEMS

**N84-33266\*#** National Aeronautics and Space Administration, Washington, D.C.

**NASA ADMINISTRATIVE DATA BASE MANAGEMENT SYSTEMS, 1984**

J. D. RADOSEVICH, ed. Sep. 1984 126 p refs Conf. held in Hampton, Va., 6-7 Jun. 1984  
(NASA-CP-2323; NAS 1.55:2323) Avail: NTIS HC A07/MF A01 CSCL 05B

CONFERENCES, DATA BASE MANAGEMENT SYSTEMS, DISTRIBUTED PROCESSING, MANAGEMENT INFORMATION SYSTEMS, NASA PROGRAMS, ON-LINE SYSTEMS

**N85-12785\*** National Aeronautics and Space Administration, Washington, D.C.

**NASA THESAURUS SUPPLEMENT: A 3-PART CUMULATIVE SUPPLEMENT TO THE 1982 EDITION OF THE NASA THESAURUS**

Jul. 1984 29 p  
(NASA-SP-7051(SUPPL-2); NAS 1.21:7051(SUPPL-2)) Avail: NTIS HC \$6.50 CSCL 05B

The three part cumulative NASA Thesaurus Supplement to the 1982 edition of the NASA Thesaurus includes: part 1, hierarchical listing; part 2, access vocabulary, and part 3, deletions. The semiannual supplement gives complete hierarchies for new terms and includes new term indications for terms new to this supplement. E.A.K.

**N86-20168\*** National Aeronautics and Space Administration, Washington, D.C.

**NASA THESAURUS. VOLUME 1: HIERARCHICAL LISTING 1985 Edition**

Sep. 1985 851 p  
(NASA-SP-7053-VOL-1; NAS 1.21:7053-VOL-1) Avail: NTIS HC \$35.00

There are 16,835 postable terms and 3,765 nonpostable terms approved for use in the NASA scientific and technical information system in the Hierarchical Listing of the NASA Thesaurus. The generic structure is presented for many terms. The broader term and narrower term relationships are shown in an indented fashion that illustrates the generic structure better than the more widely used BT and NT listings. Related terms are generously applied, thus enhancing the usefulness of the Hierarchical Listing. Greater access to the Hierarchical Listing may be achieved with the collateral use of Volume 2 - Access Vocabulary. Author

**N86-20169\*** National Aeronautics and Space Administration, Washington, D.C.

**NASA THESAURUS. VOLUME 2: ACCESS VOCABULARY 1985 Edition**

Sep. 1985 402 p  
(NASA-SP-7053-VOL-2; NAS 1.21:7053-VOL-2) Avail: NTIS HC \$20.00

The Access Vocabulary, which is essentially a permuted index, provides access to any word or number in authorized postable and nonpostable terms. Additional entries include postable and nonpostable terms, other word entries, and pseudo-multiword terms that are permutations of words that contain words within words. The Access Vocabulary contains 40,738 entries that give increased access to the hierarchies in Volume 1 - Hierarchical Listing. Author

**N86-26243\*** National Aeronautics and Space Administration, Washington, D.C.

**SIGNIFICANT NASA INVENTIONS AVAILABLE FOR LICENSING IN FOREIGN COUNTRIES**

1986 81 p  
(NASA-SP-7038(08); NAS 1.21:7038(08)) Avail: NTIS SOD HC \$5.00 as 033-000-00986-1 CSCL 05B

Abstracts of various NASA-owned inventions which are available for foreign licensing in the identified countries are listed in accordance with the NASA Patent Licensing Regulations. Instructions for requested applications are explained. B.G.

**N86-28788\*** National Aeronautics and Space Administration, Washington, D.C.

**NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY. SECTION 1: ABSTRACTS**

Jul. 1986 52 p  
(NASA-SP-7039(29)-SECT-1; NAS 1.21:7039(29)-SECT-1) Avail: NTIS HC A04 CSCL 05B

Abstracts are provided for 115 patents and patent applications entered into the NASA scientific and technical information system during the period January 1986 through June 1986. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent application. Author

**N86-28789\*** National Aeronautics and Space Administration, Washington, D.C.

**NASA PATENT ABSTRACTS BIBLIOGRAPHY. A CONTINUING BIBLIOGRAPHY. SECTION 2: INDEXES (SUPPLEMENT 29)**

Jul. 1986 483 p  
(NASA-SP-7039(29)-SECT-2; NAS 1.21:7039(29)-SECT-2) Avail: NTIS HC A21 CSCL 05B

Entries for over 4400 patents and patent applications citations for the period May 1969 through June 1986 are listed. Subject, invention, source, number, and accession number indexes are included. B.G.

## 85

## URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

**N79-10942\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**PLANNING FOR AIRPORT ACCESS: AN ANALYSIS OF THE SAN FRANCISCO BAY AREA**

J. S. DAJANI, ed. (Stanford Univ., Calif.), J. V. JUCKER, ed., and J. L. JONES (Stanford Univ.) May 1978 300 p refs  
Stanford-NASA-ASEE Summer Faculty Fellowship Program on Eng. System Design held at Moffett Field, Calif., 1977  
(NGR-05-020-409)

(NASA-CP-2044; A-7347) Avail: NTIS HC A13/MF A01 CSCL 13F

AIRPORT PLANNING, SAN FRANCISCO BAY (CA), TRAFFIC, URBAN TRANSPORTATION

**N79-28062\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**NASA JSC WATER MONITOR SYSTEM: CITY OF HOUSTON FIELD DEMONSTRATION**

R. E. TAYLOR, E. L. JEFFERS, and D. H. FRICKS Jul. 1979 57 p refs

(NASA-RP-1041; S-490; JSC-14832) Avail: NTIS HC A04/MF A01 CSCL 13B

A water quality monitoring system with on-line and real time operation similar to the function in a spacecraft was investigated. A system with the capability to determine conformance to future

high effluent quality standards and to increase the potential for reclamation and reuse of water was designed. Although all system capabilities were not verified in the initial field trial, fully automated operation over a sustained period with only routine manual adjustments was accomplished. Two major points were demonstrated: (1) the water monitor system has great potential in water monitoring and/or process control applications; and (2) the water monitor system represents a vast improvement over conventional (grab sample) water monitoring techniques. S.E.S.

**N80-18990\*#** Transportation Systems Center, Cambridge, Mass.

**IMPLICATIONS OF FUEL-EFFICIENT VEHICLES ON RIDE QUALITY AND PASSENGER ACCEPTANCE: WORKSHOP PROCEEDINGS Final Report, 6-8 Sep. 1979**

A. M. WICHANSKY, ed. and A. R. KUHLETHAU, ed. (Virginia Univ.) Aug. 1979 120 p refs Conf. held at Woods Hole, Mass., 6-8 Sep. 1978

(NASA-CP-2096; DTS-532; DOT-TSC-RSPA-79-21) Avail: NTIS HC A06/MF A01 CSCL 13F

ACCEPTABILITY, AUTOMOBILES, CONFERENCES, FUEL CONSUMPTION, PASSENGER AIRCRAFT, RIDING QUALITY

**N80-27219\*#** National Aeronautics and Space Administration, Washington, D.C.

**LESSONS OF THE NASA TECH HOUSE**

H. ALLAWAY 1980 41 p Original contains color illustrations (NASA-SP-442; LC-80-607024) Avail: NTIS MF A01; SOD HC \$3.00 CSCL 13B

The performance and effectiveness of the various systems incorporated into the NASA Technology House are described and evaluated in relation to the HUD reference house. The various aerospace technologies used (advanced electronics, solar energy utilization, water recycling, fire retardant materials) are discussed as well as the improved materials, design configurations, and construction techniques developed under other government programs and by industry. Tabular data show the consumption and conservation of electrical energy and water for each month over one full weather cycle, during which time a family of four was in residence. A.R.H.

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## SPACE SCIENCES (GENERAL)

**N77-20977\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**THE STRUCTURE AND CONTENT OF THE GALAXY AND GALACTIC GAMMA RAYS**

C. E. FICHEL, ed. and F. W. STECKER, ed. Washington 1977 356 p refs Symp. held at Greenbelt, Md., 2-4 Jun. 1976

(NASA-CP-002) Avail: NTIS HC A16/MF A01 CSCL 03B

ASTROPHYSICS, COSMIC RAYS, GALACTIC STRUCTURE, GAMMA RAYS, INTERSTELLAR GAS

**N77-33003\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**RESULTS OF ANALYSES PERFORMED ON BASALT ADJACENT TO PENETRATORS EMPLACED INTO VOLCANIC ROCK AT AMBOY, CALIFORNIA, APRIL 1976**

M. BLANCHARD, T. BUNCH, A. DAVIS (San Jose State Univ.), H. SHADE (LFE Corp.), J. ERLICHMAN (LFE Corp.), and G. POLKOWSKI (LFE Corp.) Sep. 1977 18 p refs

(NASA-TP-1026) Avail: NTIS HC A02/MF A01 CSCL 03B

BASALT, CALIFORNIA, CHEMICAL ANALYSIS, PENETRATION, PETROLOGY, ROCKS

**N78-21019\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**A BIBLIOGRAPHY ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE**

E. F. MALLOVE (Analytic Sci. Corp., Reading, Mass.), M. M. CONNORS, R. L. FORWARD (Hughes Res. Labs., Malibu, Calif.), and Z. PAPROTNY (Orzeszkowej, Poland) Mar. 1978 135 p refs

(NASA-RP-1021) Avail: NTIS HC A07/MF A01 CSCL 05B

This report presents a uniform compilation of works dealing with the search for extraterrestrial intelligence. Entries are by first author, with cross-reference by topic index and by periodical index. This bibliography updates earlier bibliographies on this general topic while concentrating on research related to listening for signals from extraterrestrial intelligence. Author

**N79-22979\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

**ALSEP TERMINATION REPORT**

J. R. BATES, W. W. LAUDERDALE (General Electric Co.), and H. KERNAGHAN (Kentron International, Inc.) Apr. 1979 161 p refs

(NASA-RP-1036; S-480) Avail: NTIS HC A08/MF A01 CSCL 03B

The Apollo Lunar Surface Experiments Package (ALSEP) final report was prepared when support operations were terminated September 30, 1977, and NASA discontinued the receiving and processing of scientific data transmitted from equipment deployed on the lunar surface. The ALSEP experiments (Apollo 11 to Apollo 17) are described and pertinent operational history is given for each experiment. The ALSEP data processing and distribution are described together with an extensive discussion on archiving. Engineering closeout tests and results are given, and the status and configuration of the experiments at termination are documented. Significant science findings are summarized by selected investigators. Significant operational data and recommendations are also included. G.Y.

**N79-22980\*#** National Aeronautics and Space Administration, Wallops Flight Center, Wallops Island, Va.

**MOLECULES OF SIGNIFICANCE IN PLANETARY AERONOMY**

H. MOHAN Jan. 1979 318 p refs

(NASA-RP-1030) Avail: NTIS HC A14/MF A01 CSCL 03B

This monograph is basically devoted to spectroscopic information of the molecules of planetary interest. Only those molecules have been dealt with which have been confirmed spectroscopically to be present in the atmosphere of major planets of our solar system and play an important role in the aeronomy of the respective planets. An introduction giving the general conditions of planets and their atmospheres including the gaseous molecules is given. Some typical planetary spectra is presented and supported with a discussion on some basic concepts of optical absorption and molecular parameters that are important to the study of planetary atmospheres. Quantities like dipole moments, transition probabilities, Einstein coefficients and line strengths, radiative life times, absorption cross sections, oscillator strengths, line widths and profiles, equivalent widths, growth curves, bond strengths, electronic transition moments, Franck-Condon factors and r-centroids, etc., are discussed. Spectroscopic information and relevant data of 6 diatomic (HF, HCl, CO, H<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>) and 6 polyatomic (CO<sub>2</sub>, N<sub>2</sub>, O<sub>3</sub>, HeO, NH<sub>3</sub>, CH<sub>4</sub>) molecules are presented. L.S.

**N79-34118\*#** National Aeronautics and Space Administration, Washington, D.C.

**SKYLAB'S ASTRONOMY AND SPACE SCIENCES**

C. A. LUNDQUIST, ed. 1979 126 p Original contains color illustrations

(NASA-SP-404) Avail: NTIS MF A01; SOD HC CSCL 03A

The capabilities of Skylab for multidisciplinary investigations are reviewed. Experiments and results are discussed for observations of stars and galaxies, energetic particles, interplanetary dust, Comet Kohoutek, the earth's atmosphere, and the nature and effects of

## 88 SPACE SCIENCES (GENERAL)

space environments on man. For individual titles, see N79-34119 through N79-34125.

**N80-14977\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### HEAO SCIENCE SYMPOSIUM

C. DAILEY, ed. and W. JOHNSON, ed. Nov. 1979 463 p refs Symp. held at Huntsville, Ala., 8-9 May 1979

(NASA-CP-2113) Avail: NTIS HC A20/MF A01 CSCL 03A

CONFERENCES, HEAO 1, HEAO 2, SPACEBORNE ASTRONOMY, X RAY ASTRONOMY

**N80-22130\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### SCIENTIFIC RESEARCH WITH THE SPACE TELESCOPE: INTERNATIONAL ASTRONOMICAL UNION COLLOQUIUM NO. 54

M. S. LONGAIR (Mullard Radio Astronomy Obs.) and J. W. WARNER Oct. 1979 331 p refs Colloq. held in Princeton, N.J., 8-11 Aug. 1979; co-sponsored by COSPAR

(NASA-CP-2111) Avail: NTIS MF A01; SOD HC CSCL 03B

ASTRONOMICAL SPECTROSCOPY, CONFERENCES, COSMOLOGY, GALACTIC EVOLUTION, HUBBLE SPACE TELESCOPE, SPACEBORNE ASTRONOMY

**N81-11966\*#** National Aeronautics and Space Administration, Washington, D.C.

### VIKING ORBITER VIEWS OF MARS

M. H. CARR, W. A. BAUM, K. R. BLASIUS, G. A. BRIGGS, J. A. CUTTS, T. C. DUXBURY, R. GREELEY, J. GUEST, H. MASURSKY, B. A. SMITH et al. 1980 189 p refs Original contains color illustrations

(NASA-SP-441) Avail: NTIS MF A01; SOD HC \$9.50 CSCL 03B

Images acquired by the Viking orbiters, beginning in 1976 are presented. The pictures represent only a small fraction of the many thousands taken, and were chosen to illustrate the diverse geology of Mars and its atmospheric phenomena. Specific topics discussed include the Viking mission and its objectives, a brief comparison of Earth and Mars, and surface features of Mars including the great equatorial canyons, channels, volcanic and deformational features, and craters. Martian moons, surface processes, polar regions, and the Martian atmosphere are also covered. J.M.S.

**N81-20962\*#** National Aeronautics and Space Administration, Washington, D.C.

### BEYOND THE ATMOSPHERE: EARLY YEARS OF SPACE SCIENCE

H. E. NEWELL 1980 512 p refs Original contains color illustrations

(NASA-SP-4211) Avail: NTIS MF A01; SOD HC \$11.00 CSCL 03C

From the rocket measurements of the upper atmosphere and Sun that began in 1946, space science gradually emerged as a new field of scientific activity. The course of the United States space program is viewed in an historical context. Major emphasis is on NASA and its programs. The funding, staffing, organization, and priorities of the space program were reviewed. For individual titles, see N81-20963 through N81-20984.

**N82-25027\*#** National Aeronautics and Space Administration, Washington, D.C.

### B STARS WITH AND WITHOUT EMISSION LINES, PARTS 1 AND 2

A. UNDERHILL, ed. and V. DOAZAN, ed. 1982 533 p refs In ENGLISH; FRENCH summary Prepared in cooperation with Centre National de la Recherche Scientifique, Paris

(NASA-SP-456; NAS 1.21:456; LC-82-2313) Avail: NTIS HC A23/MF A01 CSCL 03A

The spectra for B stars for which emission lines occur not on the main sequence, but only among the supergiants, and those B stars for which the presence of emission in H alpha is considered

to be a significant factor in delineating atmospheric structure are examined. The development of models that are compatible with all known facts about a star and with the laws of physics is also discussed. For individual titles, see N82-25028 through N82-25038.

**N84-34332\*#** Maryland Univ., College Park.

### SOLAR TERRESTRIAL PHYSICS: PRESENT AND FUTURE

D. M. BUTLER, ed. and K. PAPADOPOULOS, ed. Jun. 1984 586 p refs Workshop held in Berkeley Springs, W. Va., Dec. 1982, 6-10 Jun. and 30 Nov. 1983 Sponsored in cooperation with NASA and NSF

(NASA-RP-1120; NAS 1.61:1120) Avail: NTIS HC A25/MF A01 CSCL 03B

The following topics relating to solar-terrestrial interactions are considered: (1) reconnection of magnetic fields; (2) particle acceleration; (3) solar magnetic flux; (4) magnetohydrodynamic waves and turbulence in the Sun and interplanetary medium; (5) coupling of the solar wind to the magnetosphere; (6) coronal transients; (7) the connection between the magnetosphere and ionosphere; (8) substorms in the magnetosphere; (9) solar flares and the solar terrestrial environment; (10) shock waves in the solar terrestrial environment; (11) plasma transport and convection at high latitudes; and (12) high latitude ionospheric structure. For individual titles, see N84-34333 through N84-34344.

**N85-17755\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### THE ORIGIN OF NONRADIATIVE HEATING/MOMENTUM IN HOT STARS

A. B. UNDERHILL, ed. and A. G. MICHALITSIANOS, ed. Washington Jan. 1985 262 p refs Workshop held in Greenbelt, Md., 5-7 Jun. 1984 Sponsored in part by American Astronomical Society

(NASA-CP-2358; REPT-85B0136; NAS 1.55:2358) Avail: NTIS HC A12/MF A01 CSCL 03B

CONFERENCES, EARLY STARS, HEATING, HOT STARS, LATE STARS, MOMENTUM, STELLAR ATMOSPHERES, STELLAR EVOLUTION, STELLAR TEMPERATURE

**N85-18888\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

### THE GEOLOGY OF THE TERRESTRIAL PLANETS

M. H. CARR, ed. (Geological Survey), R. S. SAUNDERS, R. G. STROM (Geological Survey), and D. E. WILHELMS (Geological Survey) Jun. 1984 322 p refs Original contains color illustrations

(NASA-SP-469; NAS 1.21:469) Avail: NTIS MF A01; SOD HC \$16.00 as SN-033-000-00900-3 CSCL 03B

The geologic history of the terrestrial planets is outlined in light of recent exploration and the revolution in geologic thinking. Among the topics considered are planet formation; planetary craters, basins, and general surface characteristics; tectonics; planetary atmospheres; and volcanism. For individual titles see N85-18889 through N85-18894.

**N85-23457\*#** Cornell Univ., Ithaca, N.Y.

### PLANETARY GEOLOGY IN THE 1980S

J. VEVERKA 1984 199 p refs

(NSG-7156)

(NASA-SP-467; NAS 1.21:467) Avail: NTIS HC A09/MF A01; also available from NASA Information Center, Washington, D.C. 20546 \$19.00 CSCL 03C

The geologic aspects of solar system studies are defined and the goals of planetary geology are discussed. Planetary geology is the study of the origin, evolution, and distribution of matter condensed in the form of planets, satellites, asteroids, and comets. It is a multidisciplinary effort involving investigators with backgrounds in geology, chemistry, physics, astronomy, geodesy, cartography, and other disciplines concerned with the solid planets. The report is primarily restricted to the kinds of experiments and observations made through unmanned missions. B.W.

**N86-13239\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SECOND WORKSHOP ON SPACECRAFT GLOW**

J. H. WAITE, JR., ed. and T. W. MOOREHEAD, ed. Sep. 1985 294 p refs Workshop held in Huntsville, Ala., 6-7 May 1985; sponsored in part by the Universities Space Research Association (NASA-CP-2391; M-502; NAS 1.55:2391) Avail: NTIS HC A13/MF A01 CSCL 03B

EMITTANCE, FLUID DYNAMICS, LUMINOSITY, PLASMA PHYSICS, SPACE PLASMAS, SPACECRAFT ORBITS, SPECTROSCOPY

**N86-23493\*#** National Aeronautics and Space Administration, Washington, D.C.

**INTERRELATIONSHIPS AMONG CIRCUMSTELLAR, INTERSTELLAR AND INTERPLANETARY DUST**

J. A. NUTH, III, ed. and R. E. STENCEL, ed. Jan. 1986 351 p refs Workshop held in Wye, Md., 27 Feb. - 1 Mar. 1985 (NASA-CP-2403; NAS 1.55:2403) Avail: NTIS HC A16/MF A01 CSCL 03B

ASTROPHYSICS, COSMIC DUST, INTERPLANETARY DUST, INTERSTELLAR MATTER, STELLAR ENVELOPES, STELLAR EVOLUTION

**N86-27136\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**SPACE STATION PLANETOLOGY EXPERIMENTS (SSPEX)**

R. GREELEY, ed. (Arizona State Univ., Tempe) and R. J. WILLIAMS, ed. May 1986 97 p Workshop held in Flagstaff, Ariz., 20-22 Jun. 1985 (NCC9-14; NAS9-17023) (NASA-CP-2424; S-554; NAS 1.55:2424) Avail: NTIS HC A05/MF A01 CSCL 03A

METEORIDS, ORBITAL SPACE STATIONS, PARTICLES, PETROLOGY, PLANETOLOGY, SPACE EXPLORATION, WIND (METEOROLOGY)

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### ASTRONOMY

Includes radio, gamma-ray, and infrared astronomy; and astrometry.

**N77-34063\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**RECOGNITION OF COMPACT ASTROPHYSICAL OBJECTS**

H. OGELMAN, ed. and R. ROTHCHILD, ed. 1977 200 p refs (NASA-SP-421) Avail: NTIS HC A09/MF A01 CSCL 03A

NASA's Laboratory for High Energy Astrophysics and the Dept. of Physics and Astrophysics at the Univ. of Md. collaborated on a graduate level course with this title. This publication is an edited version of notes used as the course text. Topics include stellar evolution, pulsars, binary stars, X-ray signatures, gamma ray sources, and temporal analysis of X-ray data. J.L.H.

**N79-24921\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**COLLISIONLESS GALAXY SIMULATIONS**

F. HOHL, T. A. ZANG (Coll. of William and Mary, Williamsburg, Va.), and J. B. MILLER (Old Dominion Univ.) Apr. 1979 149 p refs (NASA-RP-1037; L-12730) Avail: NTIS HC A07/MF A01 CSCL 03A

Three-dimensional fully self-consistent computer models were used to determine the evolution of galaxies consisting of 100 000 simulation stars. Comparison of two-dimensional simulations with three-dimensional simulations showed only a very slight stabilizing

effect due to the additional degree of freedom. The addition of a fully self-consistent, nonrotating, exponential core/halo component resulted in considerable stabilization. A second series of computer experiments was performed to determine the collapse and relaxation of initially spherical, uniform density and uniform velocity dispersion stellar systems. The evolution of the system was followed for various amounts of angular momentum in solid body rotation. For initially low values of the angular momentum satisfying the Ostriker-Peebles stability criterion, the systems quickly relax to an axisymmetric shape and resemble elliptical galaxies in appearance. For larger values of the initial angular momentum bars develop and the systems undergo a much more drastic evolution. L.S.

**N80-11966\*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**AN EMISSION-LINE SURVEY OF THE MILKY WAY**

R. A. R. PARKER, T. R. GULL (NASA Goddard Space Flight Center), and R. P. KIRSCHNER (Mich. Univ.) Washington 1979 224 p (NASA-SP-434) Avail: SOD HC \$15.00 CSCL 03A

The instrumentation used in an examination of the ionization structure of emission nebulae and of the galactic plane in general, is described, as well as the characteristics of the prints obtained. Reasonable exposure times were obtained with the use of an image intensifier and five interference filters isolated the band passes chosen for the survey. A rough map of each field is presented with a print from the Becvar Skalnate Pleso covering the same area. No systematic effort was made to identify and mark each nebulosity. A new supernova remnant was discovered in the field 1 = 65.5 deg, b = + 5 deg using this technique. A.R.H.

**N80-18997\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**AN ASSESSMENT OF GROUND-BASED TECHNIQUES FOR DETECTING OTHER PLANETARY SYSTEMS. VOLUME 1: AN OVERVIEW**

D. C. BLACK, ed. and W. E. BRUNK, ed. (NASA, Washington, D.C.) Feb. 1980 48 p refs Workshop held at Cambridge, Mass., Nov. 1979 (NASA-CP-2124-VOL-1; A-8002) Avail: NTIS HC A03/MF A01 CSCL 03A

ASTROMETRY, CONFERENCES, PLANETARY EVOLUTION, RADIO ASTRONOMY, SOLAR SYSTEM, TECHNOLOGY ASSESSMENT

**N80-25224\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**AN ASSESSMENT OF GROUND-BASED TECHNIQUES FOR DETECTING OTHER PLANETARY SYSTEMS. VOLUME 2: POSITION PAPERS**

D. C. BLACK and W. E. BRUNK Mar. 1980 253 p refs Prepared in cooperation with NASA, Washington, D.C. (NASA-CP-2124-VOL-2; A-8114) Avail: NTIS HC A12/MF A01 CSCL 03A

ASTROMETRY, ASTRONOMICAL TELESCOPES, EXTRA-SOLAR PLANETS

**N82-31163\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ADVANCES IN ULTRAVIOLET ASTRONOMY: FOUR YEARS OF IUE RESEARCH**

Y. KONDO, ed., J. M. MEAD, ed., and R. D. CHAPMAN, ed. 1982 653 p refs Proc. of Symp. held at Greenbelt, Md., 30 Mar. - 1 Apr. 1982 (NASA-CP-2238; NAS 1.55:2238) Avail: NTIS HC A99/MF A01 CSCL 03A

ASTRONOMICAL SPECTROSCOPY, GALAXIES, INTERSTELLAR MATTER, IUE, PLANETS, QUASARS, SOLAR SYSTEM, STARS, ULTRAVIOLET ASTRONOMY

**N82-33296\*#** Space Telescope Science Inst., Huntsville, Ala.  
**THE SPACE TELESCOPE OBSERVATORY. SPECIAL SESSION OF COMMISSION 44, IAU 18TH GENERAL ASSEMBLY**  
 D. N. B. HALL, ed. 1982 138 p refs Conf. held in Patras, Greece, Aug. 1982; sponsored by NASA and ESA (NAS5-26555)  
 (NASA-CP-2244; NAS 1.55:2244) Avail: NTIS HC A07/MF A01 CSCL 03A

ASTRONOMICAL OBSERVATORIES, ASTRONOMICAL PHOTOGRAPHY, ASTRONOMICAL PHOTOMETRY, ASTRONOMICAL SPECTROSCOPY, HUBBLE SPACE TELESCOPE, SPACEBORNE ASTRONOMY, ULTRAVIOLET ASTRONOMY

**N83-27939\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**LARGE DEPLOYABLE REFLECTOR SCIENCE AND TECHNOLOGY WORKSHOP. VOLUME 2: SCIENTIFIC RATIONALE AND TECHNOLOGY REQUIREMENTS**  
 D. HOLLENBACH, ed. Jun. 1983 70 p refs Workshop held at Pacific Grove, Calif., 21-25 Jun. 1982  
 (NASA-CP-2275-VOL-2; T-5349; NAS 1.55:2275-VOL-2) Avail: NTIS HC A04/MF A01 CSCL 03A  
 CONFERENCES, INFRARED ASTRONOMY, REFLECTORS

**N84-22516\*#** National Aeronautics and Space Administration, Washington, D.C.  
**THE STAR SPLITTERS: THE HIGH ENERGY ASTRONOMY OBSERVATORIES**  
 W. H. TUCKER 1984 182 p refs  
 (NASA-SP-466; NAS 1.21:466; LC-83-16349) Avail: NTIS MF A01; SOD HC \$12.00 CSCL 03A

The nature of the high energy universe and the design of instruments to analyze stellar and galactic radiation are described in this history of the HEAO program and its scientific and technical accomplishments. Topics covered include: creative violence, stellar explosions, cosmic rays, superbubbles, stellar coronas, collapsed stars, neutron stars, degenerate dwarf stars, black holes, X-ray images of galaxies, galactic nuclei, spiral galaxies, galactic clusters, the mystery of the missing mass, and cosmic fire. A.R.H.

**N84-26519\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**FAR INFRARED SUPPLEMENT: CATALOG OF INFRARED OBSERVATIONS**  
 D. Y. GEZARI, M. SCHMITZ (Computer Sciences Corp.), and J. M. MEAD May 1984 97 p  
 (NAS5-24350)  
 (NASA-RP-1119; NAS 1.61:1119) Avail: NTIS HC A05/MF A01 CSCL 03A

The Far Infrared Supplement: catalog of infrared observations summarizes all infrared astronomical observations at far infrared wavelengths published in the scientific literature between 1965 and 1982. The Supplement list contains 25% of the observations in the full catalog of infrared observations (C10), and essentially eliminates most visible stars from the listings. The Supplement is more compact than the main Catalog (it does not contain the bibliography and position index of the C10), and is intended for easy reference during astronomical observations. E.A.K.

**N84-26520\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**CATALOG OF INFRARED OBSERVATIONS INCLUDING: BIBLIOGRAPHY OF INFRARED ASTRONOMY AND INDEX OF INFRARED SOURCE POSITIONS**  
 D. Y. GEZARI, M. SCHMITZ (Computer Sciences Corp.), and J. M. MEAD May 1984 563 p  
 (NASA-RP-1118; NAS 1.61:1118) Avail: NTIS HC A24/MF A01 CSCL 03A

The Catalog of Infrared Observations and its Far Infrared Supplement summarize all infrared astronomical observations at infrared wavelengths published in the scientific literature between 1965 and 1982. The Catalog includes as appendices the

Bibliography of infrared astronomy which keys observations in the Catalog with the original journal references, and the index of infrared source positions which gives source positions for alphabetically listed sources in the Catalog. The Catalog data base contains over 85,000 observations of about 10,000 infrared sources, of which about 2,000 have no known visible counterpart. E.A.K.

**N84-28709\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**PROCEEDINGS OF THE LARGE DEPLOYABLE REFLECTOR SCIENCE AND TECHNOLOGY WORKSHOP. VOLUME 1: EXECUTIVE SUMMARY**  
 C. A. LEIDICH and B. PITTMAN Jun. 1984 45 p refs Workshop held at Pacific Grove, Calif., 21-25 Jun. 1982  
 (NASA-CP-2275-VOL-1; A-9152; NAS 1.55:2275-VOL-1) Avail: NTIS HC A03/MF A01 CSCL 03A  
 CONFERENCES, INFRARED SPECTRA, SPACEBORNE ASTRONOMY, SPACEBORNE TELESCOPES

**N84-32318\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**LARGE DEPLOYABLE REFLECTOR SCIENCE AND TECHNOLOGY WORKSHOP. VOLUME 3: SYSTEMS AND TECHNOLOGY ASSESSMENT**  
 C. A. LEIDICH, ed. and R. B. PITTMAN, ed. Jul. 1984 65 p refs Workshop held in Pacific Grove, Calif., 21-25 Jun. 1982 3 Vol.  
 (NASA-CP-2275-VOL-3; A-9341-VOL-3; NAS 1.55:2275-VOL-3) Avail: NTIS HC A04/MF A01 CSCL 03A  
 ASTRONOMICAL OBSERVATORIES, ASTRONOMICAL TELESCOPES, CONFERENCES, FUNCTIONAL DESIGN SPECIFICATIONS, INFRARED ASTRONOMY, INFRARED RADIATION, LARGE SPACE STRUCTURES, REFLECTORS, SATELLITE DESIGN, SPACEBORNE TELESCOPES, SUBMILLIMETER WAVES, TECHNOLOGY ASSESSMENT

**N85-12833\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**ALGORITHM FOR ASTRONOMICAL, EXTENDED SOURCE, SIGNAL-TO-NOISE RADIO CALCULATIONS**  
 R. R. JAYROE Nov. 1984 23 p refs  
 (NASA-TP-2396; NAS 1.60:2396) Avail: NTIS HC A02/MF A01 CSCL 03A  
 ALGORITHMS, COMPUTER PROGRAMS, HUBBLE SPACE TELESCOPE, NONPOINT SOURCES, SIGNAL TO NOISE RATIOS, SPACEBORNE ASTRONOMY

**N85-12834\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**ALGORITHM FOR ASTRONOMICAL, POINT SOURCE, SIGNAL TO NOISE RATIO CALCULATIONS**  
 R. R. JAYROE and D. J. SCHROEDER (Beloit Coll.) Nov. 1984 40 p refs  
 (NASA-TP-2397; NAS 1.60:2397) Avail: NTIS HC A03/MF A01 CSCL 03A  
 ALGORITHMS, COMPUTER PROGRAMS, HUBBLE SPACE TELESCOPE, POINT SOURCES, SIGNAL TO NOISE RATIOS, SPACEBORNE ASTRONOMY

**N85-17848\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**AIRBORNE ASTRONOMY SYMPOSIUM. A SYMPOSIUM COMMEMORATING THE TENTH ANNIVERSARY OF OPERATIONS OF THE KUIPER AIRBORNE OBSERVATORY**  
 H. A. THRONSON, JR., ed. (Wyoming Univ., Laramie) and E. F. ERICKSON, ed. Dec. 1984 387 p refs Symp. held at Moffett Field, Calif., 11-13 Jul. 1984; sponsored by NASA and the Astronomical Society of the Pacific  
 (NASA-CP-2353; NAS 1.55:2353; REPT-85073) Avail: NTIS HC A17/MF A01 CSCL 03A  
 ASTRONOMICAL OBSERVATORIES, CONFERENCES,

INFRARED ASTRONOMY, MILKY WAY GALAXY, SOLAR SYSTEM, STARS

**N85-17892\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**PROCEEDINGS OF THE WORKSHOP ON IMPROVEMENTS TO PHOTOMETRY**

W. J. BORUCKI, ed. and A. T. YOUNG, ed. Nov. 1984 260 p refs Workshop held in San Diego, Calif., 18-19 Jun. 1984 (NASA-CP-2350; REPT-85052; NAS 1.55:2350) Avail: NTIS HC A12/MF A01 CSCL 03A CONFERENCES, PHOTOMETRY, PRECISION

**N85-20961\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**FUTURE OF ULTRAVIOLET ASTRONOMY BASED ON SIX YEARS OF IUE RESEARCH**

J. M. MEAD, ed., R. D. CHAPMAN, ed., and Y. KONDO, ed. Dec. 1984 542 p refs Symp. held in Greenbelt, Md., 3-5 Apr. 1984 (NASA-CP-2349; REPT-85B0016; NAS 1.55:2349) Avail: NTIS HC A23/MF A01 CSCL 03A

GALAXIES, INTERSTELLAR MATTER, IUE, NEBULAE, SOLAR SYSTEM, STELLAR EVOLUTION, ULTRAVIOLET ASTRONOMY

**N86-12168\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE 1982-1984 ECLIPSE OF EPSILON AURIGAE**

R. E. STENCEL, ed. Sep. 1985 115 p refs Working meeting held in Tucson, Ariz., 16-17 Jan. 1985 (NASA-CP-2384; NAS 1.55:2384; LC-85-13854) Avail: NTIS HC A06/MF A01 CSCL 03A

ASTRONOMICAL PHOTOMETRY, ASTRONOMICAL SPECTROSCOPY, AURIGA CONSTELLATION, ECLIPSING BINARY STARS, ELECTROPHOTOMETRY

## 90

### ASTROPHYSICS

Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.

**N77-12959\*#** National Aeronautics and Space Administration, Washington, D.C.

**EVOLUTION OF THE SOLAR SYSTEM**

H. ALFVEN (Calif. Univ., San Diego) and G. ARRHENIUS (Scripps Institution of Oceanography, San Diego) 1976 611 p refs (NASA-SP-345) Avail: NTIS MF A01; SOD HC \$11.00 CSCL 03B

The origin and evolution of the solar system are analyzed. Physical processes are first discussed, followed by experimental studies of plasma-solid reactions and chemical and mineralogical analyses of meteorites and lunar and terrestrial samples.

**N78-12925\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE SOVIET-AMERICAN CONFERENCE ON COSMOCHEMISTRY OF THE MOON AND PLANETS, PART 1**

J. H. POMEROY, ed. and N. J. HUBBARD, ed. 1977 503 p refs Conf. held at Moscow, 4-8 Jun. 1974 (NASA-SP-370-PT-1; LC-75-600013) Avail: NTIS MF A01; SOD HC CSCL 03B

The basic goal of the conference was consideration of the origin of the planets of the solar system, based on the physical and chemical data obtained by study of the material of the moon and planets. Papers at the conference were presented in the following sessions: (1) Differentiation of the material of the moon and planets; (2) The thermal history of the moon; (3) Lunar gravitation and magnetism; (4) Chronology of the moon, planets,

and meteorites; (5) The role of exogenic factors in the formation of the lunar surface; (6) Cosmochemical hypotheses about the origin and evolution of the moon and planets; and (7) New data about the planets Mercury, Venus, Mars, and Jupiter. For individual titles, see N78-12926 through N78-12957.

**N78-12958\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE SOVIET-AMERICAN CONFERENCE ON COSMOCHEMISTRY OF THE MOON AND PLANETS, PART 2**

J. H. POMEROY, ed. and N. J. HUBBARD, ed. 1977 423 p refs Conf. held at Moscow, 4-8 Jun. 1974 (NASA-SP-370-PT-2; LC-75-600013) Avail: NTIS MF A01; SOD HC CSCL 03B

The origin and evolution of the solar system is discussed based on ground and satellite observations. For individual titles, see N78-12959 through N78-12988.

**N81-11970\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**MOTION ABOUT THE STABLE LIBRATION POINTS IN THE LINEARIZED, RESTRICTED THREE-BODY PROBLEM**

D. MITTLEMAN (Oberlin Coll., Ohio) Sep. 1980 159 p refs (NASA-RP-1065; S-500) Avail: NTIS HC A08/MF A01 CSCL 03B

The motion of a point particle in the neighborhood of a triangular libration point (L sub 4 or L sub 5) in the linearized, restricted problem of three bodies in the plane is described. The derivation of the equations of motion is standard. From these equations, three invariants of the motion are obtained; the Jacobi integral is expressed linearly in terms of two of these. The trajectories for varied initial conditions are drawn, and a complete geometric description of the particle motion is given in elementary terms. Each trajectory has an exterior boundary curve; its equation is found. An approximation to this boundary curve was known; the two curves are compared graphically. For certain initial conditions, there is an interior region from which the trajectory is excluded; the equation of the boundary of this region is given. M.G.

**N81-25893\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE UNIVERSE AT ULTRAVIOLET WAVELENGTHS: THE FIRST TWO YEARS OF INTERNATIONAL ULTRAVIOLET EXPLORER**

R. D. CHAPMAN, ed. 1981 773 p refs Proceedings of a symp. held in Greenbelt, Md., 7-9 May 1980 (NASA-CP-2171) Avail: NTIS HC A99/MF A01 CSCL 03B CONFERENCES, IUE, SPACEBORNE ASTRONOMY, ULTRAVIOLET ASTRONOMY

**N81-27008\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**THE SUN AS A STAR**

S. D. JORDAN, ed. Jul. 1981 559 p refs Sponsored in part by CNRS (NASA-SP-450; REPT-81F0008; LC-81-600064) Avail: NTIS HC \$39.50/MF A01 CSCL 03B

Solar physics was reviewed in the context of the solar atmosphere. The understanding of the solar atmosphere is linked to stellar atmospheric research. Topics covered include: the existence of the chromosphere, the corona, and the solar wind; the interactive complex of convection, differential rotation, magnetic field generation and concentration, and the activity cycle; phenomena such as granulation, supergranulation, the 5 minute oscillation, filigree, faculae, sunspots, spicules, prominences, surges, and the spectacular flares. For individual titles, see N81-27009 through N81-27026.



**N82-21118\*#** National Aeronautics and Space Administration, Washington, D.C.

**GAMMA RAY ASTROPHYSICS: NEW INSIGHT INTO THE UNIVERSE**

C. E. FICHEL and J. I. TROMBKA Washington 1981 405 p refs Original contains color illustrations (NASA-SP-453; NAS 1.21:453; LC-81-600116) Avail: NTIS MF A01; SOD HC \$10.00 CSCL 03B

Gamma ray observations of the solar system, the galaxy and extragalactic radiation are reported. Topics include: planets, comets, and asteroids; solar observations; interstellar medium and galactic structure; compact objects; cosmology; and diffuse radiation. The instrumentation used in gamma ray astronomy is covered along with techniques for the analysis of observational spectra. For individual titles, see N82-21119 through N82-21132.

**N83-32693\*#** National Aeronautics and Space Administration, Washington, D.C.

**THE A-STARS: PROBLEMS AND PERSPECTIVES. MONOGRAPH SERIES ON NONTHERMAL PHENOMENA IN STELLAR ATMOSPHERES**

S. C. WOLFF 1983 251 p refs Prepared in cooperation with Centre National de la Recherche Scientifique, Paris (NASA-SP-463; NAS 1.21:463; LC-83-061448) Avail: NTIS HC A12/MF A01 CSCL 03B

Normal A type stars, nonradiative heating in A type stars, magnetic Ap stars. The Am stars, the delta Scu stars, A supergiants, peculiar B type stars, and model atmospheres are addressed.

Author

**N84-19253\*#** National Aeronautics and Space Administration, Washington, D.C.

**STELLAR ATMOSPHERIC STRUCTURAL PATTERNS**

R. N. THOMAS 1983 394 p refs Prepared in cooperation with CNRS, Paris (NASA-SP-471; NAS 1.21:471; LC-83-20242) Avail: NTIS HC A17/MF A01 CSCL 03B

The thermodynamics of stellar atmospheres is discussed. Particular attention is given to the relation between theoretical modeling and empirical evidence. The characteristics of distinctive atmospheric regions and their radial structures are discussed. For individual titles, see N84-19254 through N84-19259.

**N84-20457\*#** National Aeronautics and Space Administration, Goddard Inst. for Space Studies, New York, N.Y.

**MOLECULAR CLOUDS AND GALACTIC SPIRAL STRUCTURE**

T. M. DAME Feb. 1984 278 p refs (NASA-TP-2288; NAS 1.60:2288; REPT-980) Avail: NTIS HC A13/MF A01 CSCL 03B

EMISSION SPECTRA, GALACTIC STRUCTURE, MOLECULAR CLOUDS, SPIRAL GALAXIES

**N85-15539\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**LOCAL INTERSTELLAR MEDIUM. INTERNATIONAL ASTRONOMICAL UNION COLLOQUIUM NO. 81**

Y. KONDO, ed., F. C. BRUHWEILER, ed. (Catholic Univ. of America, Washington, D.C.), and B. D. SAVAGE, ed. (Wisconsin Univ., Madison) Washington Nov. 1984 356 p refs Colloq. held in Madison, Wisc., 4-6 Jun. 1984 (NASA-CP-2345; NAS 1.55:2345) Avail: NTIS HC A16/MF A01 CSCL 03C

ASTRONOMICAL MODELS, CONFERENCES, COSMOLOGY, HIGH TEMPERATURE GASES, HUBBLE SPACE TELESCOPE, INTERSTELLAR MATTER, SUN

**N86-25307\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**INTERNATIONAL ULTRAVIOLET EXPLORER ATLAS OF O-TYPESPECTRA FROM 1200 TO 1900 ANGSTROM**

N. R. WALBORN (Space Telescope Science Inst., Baltimore, Md.), J. NICHOLS-BOHLIN, and R. J. PANEK (Wellesley Coll.) Dec. 1985 153 p (NASA-RP-1155; NAS 1.61:1155) Avail: NTIS HC A08 CSCL 03B

The IUE archives provide an unprecedented sample of uniform, high-quality ultraviolet stellar spectra. In particular, they contain high-resolution SWP data for nearly 200 different O stars. We have undertaken a survey of the 1200-1900 Å region in about 120 of them having homogeneous optical spectral classifications to investigate systematically the behavior of the ultraviolet features, including the prominent stellar wind profiles and the degree to which they correlate with the optical types. The standard extracted spectrograms have been rebinned to a constant wavelength resolution of 0.25 Å and uniformly normalized (not dereddened) at the GSFC RDAF. They are then plotted at 10 Å/cm, with reuse, photometric quality and echelle order junction flags available. This atlas contains such plots for about 100 stars, arranged in spectral-type, luminosity and peculiar object sequences. The results show a high degree of correlation between the ultraviolet features, both photospheric and stellar-wind, and the optical classifications for the majority of the O-type stars.

Author

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### LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

**N77-15961\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**A GEOLOGICAL BASIS FOR THE EXPLORATION OF THE PLANETS**

R. GREELEY, ed. and M. H. CARR, ed. (Geological Survey, Menlo Park, Calif.) Washington 1976 117 p refs (NGR-05-017-037; NASA ORDER W-13576) (NASA-SP-417) Avail: NTIS HC A06/MF A01 CSCL 03B

The relevance of planetary geology in relation to the origin and evolution of the solar system and of life is discussed. Stratigraphy, structural geology and geochemistry of planets were examined.

**N77-27053\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

**LUNAR SAMPLE STUDIES**

Washington 1977 72 p refs (NASA-SP-418) Avail: NTIS HC A04/MF A01 CSCL 03B

Lunar samples discussed and the nature of their analyses are: (1) an Apollo 15 breccia which is thoroughly analyzed as to the nature of the mature regolith from which it derived and the time and nature of the lithification process, (2) two Apollo 11 and one Apollo 12 basalts analyzed in terms of chemistry, Cross-Iddings-Pirsson-Washington norms, mineralogy, and petrography, (3) eight Apollo 17 mare basalts, also analyzed in terms of chemistry, Cross-Iddings-Pirsson-Washington norms, mineralogy, and petrography. The first seven are shown to be chemically similar although of two main textural groups; the eighth is seen to be distinct in both chemistry and mineralogy, (4) a troctolitic clast from a Fra Mauro breccia, analyzed and contrasted with other high-temperature lunar mineral assemblages. Two basaltic clasts from the same breccia are shown to have affinities with rock 14053, and (5) the uranium-thorium-lead systematics of three Apollo 16 samples are determined; serious terrestrial-lead contamination of the first two samples is attributed to bandsaw cutting in the lunar curatorial facility.

Author



**N77-28055\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

## PIONEER ODYSSEY

R. O. FIMMEL Washington 1977 229 p refs  
(NASA-SP-349) Avail: NTIS MF A01; SOD HC 9.85 CSCL 03B

The Pioneer Jupiter Mission is discussed in terms of objectives, hazards, spacecraft design, and communication techniques. The scientific payloads of both Pioneer 10 and Pioneer 11 designed to gather knowledge on interplanetary space beyond Mars and on the Jovian system are included. Mission accomplishments are described. J.M.S.

**N77-29046\*#** National Aeronautics and Space Administration, Washington, D.C.

## VOYAGER TO JUPITER AND SATURN

1977 62 p  
(NASA-SP-420) Avail: NTIS HC A04/MF A01 CSCL 03B

The NASA Voyager mission to explore planets of the outer solar system is summarized. The mission schedule and profiles for encounters with Jupiter and Saturn, and possibly with Uranus and Pluto are included along with a description of the spacecraft and its trajectories. Scientific investigations to be made and the instruments carried are also discussed. A.R.H.

**N78-16973\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

## SUMMER WORKSHOP ON NEAR-EARTH RESOURCES

J. R. ARNOLD, ed. (Calif. Univ., La Jolla) and M. B. DUKE, ed. Jan. 1978 107 p refs Workshop held at La Jolla, Calif., 6-13 Aug. 1977

(NASA-CP-2031; S-482; JSC-13139) Avail: NTIS HC A06/MF A01 CSCL 03B

ASTERIODS, EXTRATERRESTRIAL RESOURCES, LUNAR SOIL, RESOURCES MANAGEMENT

**N78-20042\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

## VIKING LANDER IMAGING INVESTIGATION: PICTURE CATALOG OF PRIMARY MISSION EXPERIMENT DATA RECORD

R. B. TUCKER (Stanford Univ. Med. Center, Calif.) Feb. 1978 514 p refs  
(NASA-RP-1007; L-11752) Avail: NTIS HC A22/MF A01 CSCL 03B

All the images returned by the two Viking Landers during the primary phase of the Viking Mission are presented. Listings of supplemental information which described the conditions under which the images were acquired are included together with skyline drawings which show where the images are positioned in the field of view of the cameras. Subsets of the images are listed in a variety of sequences to aid in locating images of interest. The format and organization of the digital magnetic tape storage of the images are described. The mission and the camera system are briefly described. Author

**N78-29007\*#** National Aeronautics and Space Administration, Washington, D.C.

## ASTERIODS: AN EXPLORATION ASSESSMENT

D. MORRISON, ed. and W. C. WELLS, ed. 1978 295 p refs Conf. held at Chicago, 19-21 Jan. 1978  
(NASA-CP-2053) Avail: NTIS HC A13/MF A01 CSCL 03B

ASTERIODS, MISSION PLANNING, PLANETARY EVOLUTION, SOLAR SYSTEM, SPACE MISSIONS

**N78-30025\*#** National Aeronautics and Space Administration, Washington, D.C.

## ATLAS OF MERCURY

M. E. DAVIES, ed. (Rand Corp.), S. E. DORNIK, ed., D. E. GAULT, ed. (NASA, Ames Res. Center), and R. G. STROM, ed. (Arizona Univ.) 1978 135 p refs  
(NASA-SP-423) Avail: NTIS MF A01; HC SOD CSCL 03B

The Mariner 10 spacecraft, its scientific mission, and surface mapping techniques are described as well as the topographic features of the planet Mercury as photographed by television cameras during three flyby encounters. Shaded relief maps and a computer generated photomosaic of 9 of the 15 cartographic regions are presented. Subsequent material in the atlas includes enlargements of portions of the photomosaics, individual high resolution pictures, mosaics of small areas, and stereo pairs located within the boundaries of the cartographic regions. Footprint locations of individual pictures and stereo pairs are plotted on the shaded relief maps. Current values of the more important orbital and physical properties of Mercury are presented in tables. A.R.H.

**N79-12984\*#** National Aeronautics and Space Administration, Washington, D.C.

## THE MARTIAN LANDSCAPE

1978 160 p Original contains color illustrations  
(NASA-SP-425; LC-78-606041) Avail: HC SOD \$12.00 CSCL 03B

A first person, anecdotal account of preparations for photographing the Martian surface is related by the leader of NASA's Lander Imaging Science Team. Particular attention is given to the design of the facsimile camera. Image sequencing, picture calibration, reconstruction of color, and the search for motion on Mars are discussed. Over 200 color and black and white photographs taken by both landers are included along with a table showing the camera settings used. A stereopticon is included for viewing 19 stereopairs in three dimension. A.R.H.

**N79-14978\*#** National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

## ATMOSPHERIC ENTRY AND FRAGMENTATION OF DENSE METEORIODS

T. D. BESS Jan. 1979 37 p refs  
(NASA-TP-1333; L-12508) Avail: NTIS HC A03/MF A01 CSCL 03B

ATMOSPHERIC ENTRY, DENSITY (MASS/VOLUME), FRAGMENTATION, METEORIODS

**N79-16757\*#** National Aeronautics and Space Administration, Washington, D.C.

## SECOND INTERNATIONAL COLLOQUIUM ON MARS: ABSTRACTS FOR A COLLOQUIUM

1979 97 p refs Colloq. held at Pasadena, Calif., 15-18 Jan. 1979

(NASA-CP-2072) Avail: NTIS HC A05/MF A01 CSCL 03B

ABSTRACTS, BIBLIOGRAPHIES, MARS (PLANET), PLANETOLOGY, SPACE EXPLORATION, VIKING MARS PROGRAM

**N79-16758\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

## THE SATURN SYSTEM

D. M. HUNTEN, ed. (Ariz. Univ., Tucson) and D. MORRISON, ed. Dec. 1978 423 p Workshop held at the Reston Intern. Conf. Ctr., Reston, Virginia, 9-11 Feb. 1978  
(NAS7-100)

(NASA-CP-2068) Avail: NTIS HC A18/MF A01 CSCL 03B

CONFERENCES, INTERPLANETARY SPACECRAFT, MAGNETOSPHERE, MISSION PLANNING, NATURAL SATELLITES, SATURN ATMOSPHERE, SATURN PROJECT, SATURN RINGS

## 91 LUNAR AND PLANETARY EXPLORATION

**N80-11972\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### SPACE MISSIONS TO COMETS

M. NEUGEBAUER, ed. (JPL), D. K. YEOMANS, ed. (JPL), J. C. BRANDT, ed., and R. W. HOBBS, ed. Washington 1979 229 p refs Conf. held at Greenbelt, Md., Oct. 1977 (NASA-CP-2089) Avail: NTIS HC A11/MF A01 CSDL 03B

COMETS, CONFERENCES, FLYBY MISSIONS, SOLAR SYSTEM, SPACE MISSIONS

**N80-16009\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### HANDBOOK OF LUNAR MATERIALS

R. J. WILLIAMS, ed. and J. J. JADWICK, ed. (Lockheed Electronics Co., Houston, Tex.) Feb. 1980 133 p refs (NASA-RP-1057) Avail: NTIS HC A07/MF A01 CSDL 03B

The physical, chemical, thermodynamic, and geologic data on lunar rocks, minerals, and processes are summarized, and a set of data metals that might be extracted from lunar materials is presented. Author

**N80-16998\*** National Aeronautics and Space Administration, Washington, D.C.

### ATLAS OF MARS: THE 1:5000000 MAP SERIES

R. M. BATSON, P. M. BRIDGES, and J. L. INGE 1979 154 p refs Prepared in cooperation with Geol. Surv., Flagstaff, Ariz. (NASA ORDER W-13709; NASA ORDER W-08122; NASA ORDER W-13687; NASA ORDER L-55232) (NASA-SP-438; LC-79-600164) Avail: SOD HC \$7.00 as NAS1.21:438 CSDL 03B

Small-scale maps and photomosaics covering the entire surface of the planet Mars are presented. The cartographic contents are reduced-scale versions of the 1:5,000,000 topographic series of 30 quadrangles compiled by the U.S. Geological Survey in cooperation with NASA. Most of the quadrangles were compiled with data from the Mariner 9 spacecraft, gathered in 1972. A few sheets, however, incorporated information derived from the two Viking Orbiter spacecraft from 1976 through 1978. Several versions of each quadrangle are shown. These versions include the controlled photomosaics from which final map products were derived, airbrushed shaded relief maps based on the photomosaics and on a variety of special computer enhancements of pictures not included in the mosaics, shaded relief maps with overprints of albedo markings derived by special enhancements of selected Mariner 9 images and contour maps derived from a wide variety of nonimage data ranging from Earth-based radar to remote sensing instruments on the Mariner 9 spacecraft. Discussions of mapping procedures and a gazetteer of feature nomenclature on Mars are included in appendices. A.R.H.

**N80-26239\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

### IMAGES OF MARS: THE VIKING EXTENDED MISSION

M. H. CARR (Geological Survey) and N. EVANS 1980 35 p (NASA-SP-444) Avail: NTIS HC A01; SOD HC \$2.25 CSDL 03B

Although the Viking spacecraft were designed to operate for only 90 days, the two landers and one orbiter have been observing seasonal changes in the Martian atmosphere and surface for almost 4 years (2 Martian years). Views of the planet, some taken as recently as late 1979, show volcanoes, lava plains, channels, canyons, plateaus, impact craters, wind erosion, global dust storms, polar caps, clouds, and the surface features of Phobos and Deimos. The latter image is the highest resolution picture ever taken of another object from an orbiter or flying spacecraft. A.R.H.

**N80-27260\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### PROJECT ORION: A DESIGN STUDY OF A SYSTEM FOR DETECTING EXTRASOLAR PLANETS

D. C. BLACK, ed. 1980 214 p refs Original contains color illustrations (NASA-SP-436; LC-80-11728) Avail: NTIS MF A01; SOD HC \$5.50 CSDL 03B

A design concept for a ground based astrometric telescope that could significantly increase the potential accuracy of astrometric observations is considered. The state of current techniques and instrumentation is examined in the context of detecting extrasolar planets. Emphasis is placed on the direct detection of extrasolar planets at either visual or infrared wavelengths. The design concept of the imaging stellar interferometer (ISI), developed under Project Orion, is described. The Orion ISI employs the state-of-the-art technology and is theoretically capable of attaining 0.00010 arc sec/yr accuracy in relative astrometric observations. J.M.S.

**N81-10910\*#** National Aeronautics and Space Administration, Washington, D.C.

### VOYAGE TO JUPITER

D. MORRISON and J. SAMZ 1980 204 p Original contains color illustrations (NASA-SP-439; LC-80-600126) Avail: NTIS MF A01; SOD HC \$7.50 CSDL 03B

Early observations of the Jovian system are reviewed as well as the scientific objectives of the Pioneer and Voyager flyby missions. Launch vehicles, spacecraft trajectories, and the instruments carried are described. Photographs obtained by both voyage spacecraft are presented along with day-by-day summaries of the findings recorded by the various instruments and experiments carried by each spacecraft. Pictorial maps of the Galilean satellites, and lists of the Voyager science and managements teams are included. A.R.H.

**N81-15925\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### PIONEER: FIRST TO JUPITER, SATURN, AND BEYOND

R. O. FIMMEL, J. VANALLEN (Iowa Univ.), and E. BURGESS 1980 296 p refs Original contains color illustrations (NASA-SP-446) Avail: NTIS MF A01; SOD HC \$13.00 CSDL 03B

The Pioneer Program continues to achieve far beyond its original objectives because of the successful missions of Pioneers 10 and 11 which have been in space over 8 years and 7 years, respectively. An overview of the Pioneer Jupiter/Saturn mission is presented including the planning process; technical aspects of the spacecraft design and operation; and the scientific payloads and the experiments conducted during interplanetary flight and the flyby portion of the missions. Data obtained from the various experiments are analyzed. The imaging photopolarimeter is described and technical details of planetary images are examined. A.R.H.

**N81-25012\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

### VIKING LANDER IMAGING INVESTIGATION DURING EXTENDED AND CONTINUATION AUTOMATIC MISSIONS. VOLUME 1: LANDER 1 PICTURE CATALOG OF EXPERIMENT DATA RECORD Final Report

K. L. JONES, M. HENSHAW, C. MCMENOMY, A. ROBLES, P. C. SCRIBNER, S. D. WALL, and J. W. WILSON Apr. 1981 655 p (NASA-RP-1068; L-14054-VOL-1) Avail: NTIS HC A99/MF A01 CSDL 03B

All images returned by Viking Lander 1 during the extended and continuation automatic phases of the Viking Mission are presented. Listings of supplemental information which describe the conditions under which the images were acquired are included together with skyline drawings which show where the images are positioned in the field of view of the cameras. Subsets of the images are listed in a variety of sequences to aid in locating images of interest. The format and organization of the digital

magnetic tape storage of the images are described as well as the mission and the camera system. A.R.H.

**N81-25992\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**VIKING SITE SELECTION AND CERTIFICATION**

H. MASURSKY (Geological Survey, Flagstaff, Ariz.) and N. L. CRABILL Washington 1981 39 p refs (NASA-SP-429) Avail: NTIS HC A03/MF A01 CSCL 03B

The landing site selection and certification effort for the Viking mission to Mars is reviewed from the premission phase through the acquisition of data and decisions during mission operations and the immediate postlanding evaluation. The utility and limitations of the orbital television and infrared data and ground based radar observation of candidate and actual landing sites are evaluated. Additional instruments and types of observations which would have been useful include higher resolution cameras, radar altimeters, and terrain hazard avoidance capability in the landing system. Suggestions based on this experience that might be applied to future missions are included. J.D.H.

**N82-16028\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**VIKING LANDER IMAGING INVESTIGATION DURING EXTENDED AND CONTINUATION AUTOMATIC MISSIONS. VOLUME 2: LANDER 2 PICTURE CATALOG OF EXPERIMENT DATA RECORD**

K. L. JONES, M. HENSHAW, C. MCMENOMY, A. ROBLES, P. C. SCRIBNER, S. D. WALL, and J. W. WILSON Apr. 1981 566 p refs 2 Vol. (NASA-RP-1068-VOL-2; L-14054) Avail: NTIS HC A24/MF A01 CSCL 03B

Images returned by the two Viking landers during the extended and continuation automatic phases of the Viking Mission are presented. Information describing the conditions under which the images were acquired is included with skyline drawings showing the images positioned in the field of view of the cameras. Subsets of the images are listed in a variety of sequences to aid in locating images of interest. The format and organization of the digital magnetic tape storage of the images are described. A brief description of the mission and the camera system is also included. Author

**N82-25043\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**VIBRATIONAL-ROTATIONAL SPECTROSCOPY FOR PLANETARY ATMOSPHERES, VOLUME 1**

M. J. MUMMA, ed., K. FOX, ed. (Tennessee Univ.), and J. HORNSTEIN, ed. (Computer Sciences Corp.) Apr. 1982 416 p refs Proceedings of Workshop held at Annapolis, 17-19 Mar. 1980

(NASA-CP-2223-VOL-1; NAS 1.55:2223-VOL-1) Avail: NTIS HC A18/MF A01 CSCL 03B

EARTH ATMOSPHERE, INFRARED RADIOMETERS, JUPITER ATMOSPHERE, LASER SPECTROSCOPY, MARS ATMOSPHERE, MOLECULAR SPECTRA, PLANETARY ATMOSPHERES, SPECTROMETERS, VIBRATIONAL SPECTRA

**N82-26134\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**VIBRATIONAL-ROTATIONAL SPECTROSCOPY FOR PLANETARY ATMOSPHERES, VOLUME 2**

M. J. MUMMA, ed., K. FOX, ed. (Tennessee Univ.), and J. HORNSTEIN, ed. (Computer Sciences Corp.) Apr. 1982 242 p refs Proceedings of Workshop held at Annapolis, Md., 17-19 Mar. 1980

(NASA-CP-2223-VOL-2; NAS 1.55:2223) Avail: NTIS HC A11/MF A01 CSCL 03B

ATMOSPHERIC COMPOSITION, CONFERENCES, HYDROGEN, LINE SPECTRA, METHANE, PLANETARY ATMOSPHERES

**N82-26152\*#** National Aeronautics and Space Administration, Washington, D.C.

**VOYAGES TO SATURN**

D. MORRISON 1982 232 p refs (NASA-SP-451; NAS 1.21:451; LC-81-600073) Avail: NTIS HC A11/MF A01 CSCL 03B

The Voyager mission to Saturn is explained in detail. A history of Saturn observations from ancient times to the present is given. The Voyager spacecraft and their instruments are described. An overview of planetary astronomy is presented. The text is supplemented by numerous black and white and color photographs. The Saturn satellites are discussed in detail, and preliminary pictorial maps of the satellites are given. R.J.F.

**N83-12031\*#** Arizona Univ., Tucson. Lunar and Planetary Lab.

**NASA CATALOGUE OF LUNAR NOMENCLATURE**

L. A. ANDERSSON and E. A. WHITAKER Washington Oct. 1982 172 p (NGL-03-002-191)

(NASA-RP-1097; NAS 1.61:1097) Avail: NTIS HC A08/MF A01 CSCL 03B

Lunar nomenclature is cataloged. It includes letter designations for subsidiary craters, and uses a more familiar spelling from eight names. The listed features are divided into three main groups for cataloging purposes, namely: (1) craters, (2) noncrater features; and (3) minor and miscellaneous features. S.L.

**N83-25636\*** Geological Survey, Flagstaff, Ariz.

**A CATALOG OF SELECTED VIKING ORBITER IMAGES**

R. L. TURNER and R. D. CARROLL Feb. 1983 402 p refs (NASA-RP-1093; NAS 1.61:1093) Avail: NTIS HC A17 CSCL 03B

This collection of Viking Orbiter photomosaics is designed to facilitate identification and location of the various pictures with respect to the surface of Mars. Only a representative set of the nearly 50,000 images taken by the two Viking Orbiters, and computer-processed prior to December 1978, are contained in the mosaics and in the picture listings. Author

**N83-30340\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**PIONEER VENUS**

R. O. FIMMEL, L. COLIN, and E. BURGESS 1983 254 p refs Original contains color illustrations (NASA-SP-461; NAS 1.21:461) Avail: NTIS MF A01; SOD HC \$11.00 CSCL 03B

Venus before Pioneer, the Pioneer Venus mission, Pioneer Venus spacecraft, scientific investigation, mission to Venus scientific results, and results of Soviet studies of Venus are addressed. A chronology of exploration of Venus from Earth before the Pioneer Venus mission and Venus nomenclature and mythology are provided. Author

**N84-32330\*** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**PHOBOS: CLOSE ENCOUNTER IMAGING FROM THE VIKING ORBITERS**

T. C. DUXBURY, J. D. CALLAHAN, and A. C. OCAMPO Jul. 1984 56 p (NASA-RP-1109; NAS 1.61:1109) Avail: NTIS HC A04 CSCL 03B

The shape and orbital characteristics of Phobos, the larger and innermost of Mars' two irregular moons, are discussed and illustrated. Also presented are the high resolution pictures of Phobos that were obtained during the close flybys of Viking Orbiters 1 and 2. The viewing geometry is also given for each picture. E.R.

## 91 LUNAR AND PLANETARY EXPLORATION

**N84-34363\*#** National Aeronautics and Space Administration, Washington, D.C.

### **TRENDS IN PLANETARY DATA ANALYSIS. EXECUTIVE SUMMARY OF THE PLANETARY DATA WORKSHOP**

N. EVANS Sep. 1984 46 p Workshop held in Greenbelt, Md., 29 Nov. - 2 Dec. 1983  
(NASA-CP-2333; NAS 1.55:2333) Avail: NTIS HC A03/MF A01 CSCL 03B

DATA BASES, DATA MANAGEMENT, DATA REDUCTION, DATA SYSTEMS, IMAGE ANALYSIS, PLANETOLOGY, USER REQUIREMENTS

**N84-34366\*#** National Aeronautics and Space Administration, Washington, D.C.

### **PLANETARY DATA WORKSHOP, PART 1**

Oct. 1984 143 p Workshop held in Greenbelt, Md., 29 Nov. - 1 Dec. 1983 2 Vol.  
(NASA-CP-2343-PT-1; NAS 1.55:2343-PT-1) Avail: NTIS HC A07/MF A01 CSCL 03B

CONFERENCES, DATA BASE MANAGEMENT SYSTEMS, PLANETS, SPACE EXPLORATION, SPACE OBSERVATIONS (FROM EARTH), SPACEBORNE EXPERIMENTS

**N84-34376\*#** National Aeronautics and Space Administration, Washington, D.C.

### **PLANETARY DATA WORKSHOP, PART 2**

Oct. 1984 133 p Workshop held in Greenbelt, Md., 29 Nov. - 1 Dec. 1983 2 Vol.  
(NASA-CP-2343-PT-2; NAS 1.55:2343-PT-2) Avail: NTIS HC A07/MF A01 CSCL 03B

COMMUNICATING, COMPUTER GRAPHICS, COMPUTER NETWORKS, COMPUTER SYSTEMS DESIGN, COMPUTER SYSTEMS PROGRAMS, CONFERENCES, DATA BASE MANAGEMENT SYSTEMS, DATA MANAGEMENT, DATA PROCESSING, DATA STORAGE, DATA SYSTEMS, GEOMETRY, IMAGE PROCESSING

**N84-35242\*#** National Aeronautics and Space Administration, Washington, D.C.

### **VOYAGER 1 AND 2 ATLAS OF SIX SATURNIAN SATELLITES**

R. M. BATSON et al. 1984 175 p refs Original contains color illustrations  
(NASA ORDER WO-8395; NASA ORDER W-13709)  
(NASA-SP-474; NAS 1.21:474; LC-84-11580) Avail: NTIS HC A08 CSCL 03B

Maps, compiled with data gathered primarily by Voyager 1 and 2 spacecraft, are presented which show the diversity among six of the Saturnian moons. Mimas and Enceladus are mapped in detail. Preliminary maps are given for the other four satellites. Diameter, density, albedo, and distance from mother planet, among much more data, is given for each moon. E.R.

**N84-35248\*#** National Aeronautics and Space Administration, Washington, D.C.

### **ON MARS: EXPLORATION OF THE RED PLANET, 1958 - 1978**

E. C. EZELL, ed. and L. N. EZELL, ed. 1984 545 p refs Original contains color illustrations  
(NASA-SP-4212; NAS 1.21:4212; LC-82-22302) Avail: NTIS MF A01; SOD HC \$20.00 as 033-000-00869-4 CSCL 03B

The exploration of Mars is covered by the following topics: Mariner spacecraft and launch vehicles, search for Martian life; Voyager spacecraft; creation of Viking; Viking Orbiter and its Mariner inheritance; Viking lander; building a complex spacecraft; selecting landing sites; site certification, and data from Mars. For individual titles see N84-35249 through N84-35259.

**N85-11927\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

### **URANUS AND NEPTUNE**

J. T. BERGSTRALH, ed. Washington Oct. 1984 605 p refs Workshop held in Pasadena, Calif., 6-8 Feb. 1984  
(NASA-CP-2330; NAS 1.55:2330) Avail: NTIS HC A99/MF A01; SOD HC CSCL 03B

CONFERENCES, MAGNETOSPHERE, NEPTUNE (PLANET), PLANETARY RINGS, SPECTRUM ANALYSIS, URANUS (PLANET), VOYAGER PROJECT

**N85-21099\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

### **CONCLUSION OF VIKING LANDER IMAGING INVESTIGATION: PICTURE CATALOG OF EXPERIMENT DATA RECORD**

S. D. WALL and T. C. ASHMORE Mar. 1985 175 p refs  
(NASA-RP-1137; L-15925; NAS 1.61:1137) Avail: NTIS HC A04/MF A01 CSCL 03B

The images returned by the two Viking landers during the Viking Survey Mission are presented in this report. Listing of supplemental information which describe the conditions under which the images were acquired are included. Subsets of the images are listed in a variety of sequences to aid in locating images of interest. The format and organization of the digital magnetic tape storage of the images are described. A brief description of the mission and the camera system is also included. Author

**N85-22323\*#** National Aeronautics and Space Administration, Washington, D.C. The Planetary Cartography Working Group.

### **PLANETARY CARTOGRAPHY IN THE NEXT DECADE (1984 - 1994)**

1984 71 p refs  
(NASA-SP-475; NAS 1.21:475) Avail: NTIS HC \$10.00/MF A01 CSCL 03A

The cartographic products required to support science and planetary exploration during the next 10 years were assessed. Only major map series or first order maps needed to characterize the surface physiography of a planet or satellite were considered. Included in these considerations are maps needed as bases for plotting geologic, geophysical, and atmospheric phenomena and for planning future planetary exploration. These products consist of three types of maps: controlled photomosaics, shaded relief maps, and topographic contour maps. E.A.K.

**N86-11137\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

### **GALILEO: EXPLORATION OF JUPITER'S SYSTEM**

T. V. JOHNSON, C. M. YEATES, L. COLIN (NASA. Ames Research Center), F. P. FANALE (Hawaii Univ.), L. FRANK (Iowa Univ.), and D. M. HUNTEN (Arizona Univ.) Jun. 1985 179 p refs  
(NASA-SP-479; NAS 1.21:479) Avail: NTIS HC A09/MF A01 CSCL 03B

The scientific objectives of the Galileo mission to the Jovian system is presented. Topics discussed include the history of the project, our current knowledge of the system, the objectives of interrelated experiments, mission design, spacecraft, and instruments. The management, scientists, and major contractors for the project are also given. Author

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## SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

**N79-20961\*#** National Aeronautics and Space Administration, Washington, D.C.

**SUN, WEATHER, AND CLIMATE**

J. R. HERMAN and R. A. GOLDBERG 1978 365 p refs (NASA-SP-426; LC-78-606053) Avail: NTIS MF A01; SOD HC CSCL 03B

The general field of Sun-weather/climate relationships, that is, apparent weather and climate responses to solar activity is introduced and theoretical and experimental suggestions for further research to identify and investigate the unknown causal mechanisms are provided. Topics of discussion include: (1) solar-related correlation factors and energy sources; (2) long-term climatic trends; (3) short-term meteorological correlations; (4) miscellaneous obscuring influences; (5) physical processes and mechanisms; (6) recapitulation of sun-weather relationships; and (7) guidelines for experiments. For individual titles, see N79-20962 through N79-20969.

**N79-22991\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**A NEW SUN: THE SOLAR RESULTS FROM SKYLAB**

J. A. EDDY and R. ISE, ed. Washington 1979 220 p Original contains color illustrations (NASA-SP-402) Avail: NTIS MF A01; SOD HC \$10.50 CSCL 03B

The highlights of the new and exciting pictures of the sun as taken by Skylab astronauts are presented. Topics of discussion and pictures include: (1) the nearest star; (2) the masks of the sun; (3) the sun from space; (4) the solar telescope on Skylab; and (5) the solar results from Skylab - the quiet sun and the active Sun. G.Y.

**N80-17944\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**STUDY OF THE SOLAR CYCLE FROM SPACE**

Feb. 1980 366 p refs Symp. held at Wellesley, Mass., 14-15 Jun. 1979; sponsored in part by Am. Astron. Soc. (NASA-CP-2098; REPT-7801) Avail: NTIS HC A16/MF A01 CSCL 03B

ASTROMETRY, CONFERENCES, MISSION PLANNING, SOLAR CYCLES, SPACEBORNE ASTRONOMY, SUN

**N81-13912\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**ENVIRONMENTAL ANALYSIS OF THE CHEMICAL RELEASE MODULE**

J. P. HEPPNER and M. DUBIN Nov. 1980 131 p refs (NASA-TP-1750; REPT-80-F-5120) Avail: NTIS HC A07/MF A01 CSCL 13B

ATMOSPHERIC CHEMISTRY, ATMOSPHERIC PHYSICS, CHEMICAL CLOUDS, ENVIRONMENT EFFECTS, SPACE SHUTTLE PAYLOADS

**N81-23004\*** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**AN ATLAS OF SOLAR SPECTRA BETWEEN 1175 AND 1950 ANGSTROMS RECORDED ON SKYLAB WITH THE NRL'S APOLLO TELESCOPE MOUNT EXPERIMENT**

L. COHEN Mar. 1981 566 p (NASA-RP-1069) Avail: SOD HC \$31.00 CSCL 03B

Spectra of selected solar regions were recorded by the Naval Research Laboratory slit spectrograph on the Apollo Telescope Mount aboard Skylab. This atlas of those spectra is intended as a guide to the formulation of experiments and analysis of data obtained by extreme ultraviolet spectrographs and may be valuable to investigators analyzing International Ultraviolet Explorer spectra

and data from Solar Maximum Mission and High Resolution Telescope Spectrograph. The slit spectrograph was used to cover the range 1175 Å to 1950 Å with a spectral resolution of 0.06 Å and a spatial resolution at Sun center of 2 deg by 30 deg. Microdensitometer tracings of spectra from (1) a quiet region, (2) an active region, (3) a coronal hole, and (4) a flare are included and were computer processed to include the characteristic curve of the film. Line identifications for prominent features are included as well as a reference scale permitting the user to obtain absolute intensities. J.M.S.

**N82-17014\*#** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

**VARIATIONS OF THE SOLAR CONSTANT**

S. SOFIA, ed. Dec. 1981 285 p refs Workshop held in Greenbelt, Md., 5-7 Nov. 1980

(NASA-CP-2191) Avail: NTIS HC A13/MF A01 CSCL 03B

CONFERENCES, PERIODIC VARIATIONS, SOLAR CONSTANT, STELLAR STRUCTURE

**N83-13048\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**THE PINHOLE/OCCULTER FACILITY**

J. R. DABBS, E. A. TANDBERG-HANSEN, and H. S. HUDSON (California Univ., San Diego) Oct. 1982 16 p (NASA-TP-2089; NAS 1.60:2089) Avail: NTIS HC A02/MF A01 CSCL 03B

SOLAR ACTIVITY, SOLAR CORONA, SOLAR WIND, X RAY ASTRONOMY

**N83-25646\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**THE PINHOLE/OCCULTER FACILITY**

E. A. TANDBERG-HANSEN, ed., H. S. HUDSON, ed. (California Univ., San Diego), J. R. DABBS, ed., and W. A. BAITY, ed. (California Univ., San Diego) Apr. 1983 55 p refs (NASA-TP-2168; NAS 1.60:2168) Avail: NTIS HC A04/MF A01 CSCL 03B

CORONAGRAPHS, OCCULTATION, PINHOLES, SOLAR PHYSICS, SPACE SHUTTLE PAYLOADS, X RAY ASTRONOMY

**N84-13067\*#** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**SOLAR WIND FIVE**

M. NEUGEBAUER, ed. Washington Nov. 1983 688 p refs Conf. held in Woodstock, Vt., 1-5 Nov. 1982 (NASA-CP-2280; NAS 1.55:2280) Avail: NTIS HC A99/MF A01 CSCL 03B

CONFERENCES, ENERGETIC PARTICLES, MAGNETIC FIELD CONFIGURATIONS, MAGNETOHYDRODYNAMIC TURBULENCE, SOLAR CORONA, SOLAR WIND

**N84-24520\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**A COMPARATIVE LOOK AT SUNSPOT CYCLES**

R. M. WILSON May 1984 177 p refs (NASA-TP-2325; NAS 1.60:2325) Avail: NTIS HC A09/MF A01 CSCL 03B

REGRESSION ANALYSIS, SOLAR ACTIVITY, SUN, SUNSPOT CYCLE

**N84-27635\*#** National Aeronautics and Space Administration, Washington, D.C.

**SOLAR IRRADIANCE VARIATIONS ON ACTIVE REGION TIME SCALES**

B. J. LABONTE, ed. (Hawaii Univ. at Manoa, Honolulu), G. A. CHAPMAN, ed. (California State Univ., Northridge), H. S. HUDSON, ed. (California Univ. at San Diego, La Jolla), and R. C. WILLSON, ed. (JPL) Washington May 1984 310 p refs Proc. of workshop held in Pasadena, Calif., 20-21 Jun. 1983 (NASA-CP-2310; NAS 1.55:2310) Avail: NTIS HC A14/MF A01 CSCL 03B

IRRADIANCE, LIMB DARKENING, SOLAR ACTIVITY

EFFECTS, SOLAR TERRESTRIAL INTERACTIONS, SPECTRUM ANALYSIS

**N85-29869\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**MEASUREMENTS OF SOLAR VECTOR MAGNETIC FIELDS**

M. J. HAGYARD, ed. Washington May 1985 477 p refs Conf. held in Huntsville, Ala., 15-18 May 1984; sponsored by NASA, Alabama Univ., and NOAA. Original contains color illustrations (NASA-CP-2374; M-484; NAS 1.55:2374) Avail: NTIS HC A21/MF A01 CSCL 03B

DATA REDUCTION, DISPLAY DEVICES, FORCE-FREE MAGNETIC FIELDS, MAGNETIC FLUX, PHOTOSPHERE, SOLAR ATMOSPHERE, SOLAR CORONA, SOLAR MAGNETIC FIELD, VECTORS (MATHEMATICS)

**N85-34729\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. SH SESSIONS, VOLUME 4**

F. C. JONES, comp. Washington Aug. 1985 543 p refs Conf. held in La Jolla, Calif., 11-23 Aug. 1985 8 Vol. (NASA-CP-2376-VOL-4; NAS 1.55:2376-VOL-4) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAYS, HELIOSPHERE, INTERPLANETARY MEDIUM, PARTICLE ACCELERATION, SOLAR CORPUSCULAR RADIATION, SOLAR FLARES

**N86-24614\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SOLAR FLARES AND CORONAL PHYSICS USING P/O F AS A RESEARCH TOOL**

E. TANDBERG, ed., R. M. WILSON, ed., and R. M. HUDSON, ed. (California Univ., San Diego, La Jolla) Apr. 1986 307 p refs Workshop held in Huntsville, Ala., 8-10 May 1985 (NASA-CP-2421; M-523; NAS 1.55:2421) Avail: NTIS HC A14/MF A01 CSCL 03B

OCCULTATION, PINHOLES, SOLAR CORONA, SOLAR FLARES, SOLAR PHYSICS, SOLAR X-RAYS

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## SPACE RADIATION

Includes cosmic radiation; and inner and outer earth's radiation belts.

**N79-27057\*#** Texas Univ., Austin.

**CATALOG OF FAR-ULTRAVIOLET OBJECTIVE-PRISM SPECTROPHOTOMETRY: SKYLAB EXPERIMENT S-019, ULTRAVIOLET STELLAR ASTRONOMY**

K. G. HENIZE, J. D. WRAY, S. B. PARSONS, and G. F. BENEDICT May 1979 545 p refs Prepared in cooperation with Texas Univ. at Austin (NAS9-13176; NAS8-13176; NAS8-31459; NSG-7371) (NASA-RP-1031; S-495) Avail: NTIS HC A03/MF A01 CSCL 03B

Ultraviolet stellar spectra in the wavelength region from 1300 to 5000 Å (130 to 500 nm) were photographed during the three manned Skylab missions using a 15 cm aperture objective-prism telescope. The prismatic dispersion varied from 58 Å/mm at 1400 Å to 1600 Å/mm at 3000 Å. Approximately 1000 spectra representing 500 stars were measured and reduced to observed fluxes. About 100 stars show absorption lines of Si IV, C IV, or C II. Numerous line features are also recorded in supergiant stars, shell stars, A and F stars, and Wolf-Rayet stars. Most of the stars in the catalog are of spectral class B, with a number of O and A type stars and a sampling of WC, WN, F and C type stars. Spectrophotometric results are tabulated for these 500 stars. Author

**N82-33320\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**EARTH RADIATION SCIENCE SEMINARS**

J. B. HALL, JR., comp. Aug. 1982 175 p refs Seminars held at Hampton, Va., Jun. 1980 - Oct. 1981 (NASA-CP-2239; L-15483; NAS 1.55:2239) Avail: NTIS HC A08/MF A01 CSCL 03B

CARBON DIOXIDE CONCENTRATION, CONFERENCES, EARTH RADIATION BUDGET EXPERIMENT, INSOLATION, RADIOMETERS

**N83-29169\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**HEAVY ION TRANSPORT IN THE STRAIGHT AHEAD APPROXIMATION**

J. W. WILSON Jun. 1983 22 p refs (NASA-TP-2178; L-15623; NAS 1.60:2178) Avail: NTIS HC A02/MF A01 CSCL 03B

APPROXIMATION, HEAVY IONS, TRANSPORT PROPERTIES

**N84-21485\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**MEAN EXCITATION ENERGIES FOR STOPPING POWERS IN VARIOUS MATERIALS USING LOCAL PLASMA OSCILLATOR STRENGTHS**

J. W. WILSON, Y. J. XU (Old Dominion Univ.), E. KAMARATOS (Christopher Newport Coll.), and C. K. CHANG (Christopher Newport Coll.) Mar. 1984 38 p refs (NCC1-42; NSG-1614) (NASA-TP-2271; L-15731; NAS 1.60:2271) Avail: NTIS HC A03/MF A01 CSCL 03B

ABSORBERS (MATERIALS), ENERGY TRANSFER, EXCITATION, PLASMA OSCILLATIONS, STOPPING POWER

**N85-33901\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. CONFERENCE PROGRAM AND AUTHOR INDEX**

F. C. JONES, comp. Washington Aug. 1985 259 p Conf. held in La Jolla, Calif., 11-23 Aug. 1985 (NASA-CP-2376; NAS 1.55:2376) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAYS, EXTRATERRESTRIAL RADIATION, INDEXES (DOCUMENTATION)

**N85-33902\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. OG SESSIONS, VOLUME 1**

F. C. JONES, comp. Washington Aug. 1985 409 p refs Conf. held in La Jolla, Calif., 11-23 Aug. 1985 8 Vol. (NASA-CP-2376-VOL-1; NAS 1.55:2376-VOL-1) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAYS, DIFFUSE RADIATION, GAMMA RAY ASTRONOMY, GAMMA RAYS, POINT SOURCES

**N85-34006\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. OG SESSIONS, VOLUME 2**

F. C. JONES, comp. Washington Aug. 1985 441 p refs Conf. held in La Jolla, Calif., 11-23 Aug. 1985 8 Vol. (NASA-CP-2376-VOL-2; NAS 1.55:2376-VOL-2) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

ANTI-PROTONS, CONFERENCES, COSMIC RAYS, ENERGY SPECTRA, ISOTOPES, NUCLEI (NUCLEAR PHYSICS)

**N85-34862\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. OG SESSIONS, VOLUME 3**

F. C. JONES, comp. Washington Aug. 1985 530 p refs Conf. held in La Jolla, Calif., 11-23 Aug. 1985 8 Vol. (NASA-CP-2376-VOL-3; NAS 1.55:2376-VOL-3) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAYS, NUCLEAR INTERACTIONS, PARTICLE ACCELERATION

**N85-34991\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. SH SESSIONS, VOLUME 5**

F. C. JONES, comp. Washington Aug. 1985 589 p refs Conf. held in La Jolla, Calif., 11-23 Aug. 1985 8 Vol. (NASA-CP-2376-VOL-5; NAS 1.55:2376-VOL-5) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAYS, HELIOSPHERE, PERIODIC VARIATIONS, SOLAR CORPUSCULAR RADIATION, SOLAR NEUTRINOS

**N85-35848\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. HE SESSIONS, VOLUME 6**

F. C. JONES, comp. Washington Aug. 1985 496 p refs Conf. held in La Jolla, Calif., 11-23 Aug. 1985 8 Vol. (NASA-CP-2376-VOL-6; NAS 1.55:2376-VOL-6) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAYS, HIGH ENERGY INTERACTIONS, NUCLEI (NUCLEAR PHYSICS), PARTICLE INTERACTIONS, PARTICLE PRODUCTION

**N85-35968\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. HE SESSIONS, VOLUME 7**

F. C. JONES, comp. Washington Aug. 1985 398 p refs Conf. held in La Jolla, Calif., 11-23 Aug. 1985 8 Vol. (NASA-CP-2376-VOL-7; NAS 1.55:2376-VOL-7) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAY SHOWERS, COSMIC RAYS, GAMMA RAYS, HIGH ENERGY INTERACTIONS

**N85-36066\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. HE SESSIONS, VOLUME 8**

F. C. JONES, comp. Washington Aug. 1985 387 p refs Conf. held in La Jolla, Calif., 11-23 Aug. 1985 8 Vol. (NASA-CP-2376-VOL-8; NAS 1.55:2376-VOL-8) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAYS, MAGNETIC MONOPOLES, MUONS, NEUTRINOS

**N86-21492\*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**ELECTROMAGNETIC DISSOCIATION EFFECTS IN GALACTIC HEAVY-ION FRAGMENTATION**

J. W. NORBURY and L. W. TOWNSEND Feb. 1986 48 p refs (NASA-TP-2527; L-16033; NAS 1.60:2527) Avail: NTIS HC A03/MF A01 CSCL 03B

COULOMB COLLISIONS, DISSOCIATION, GALACTIC COSMIC RAYS, HEAVY IONS, RADIATION SHIELDING

**N86-28904\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE PAPERS. GENERAL INDEX, VOLUME 10**

F. C. JONES, comp. Jul. 1986 104 p Conference held in La Jolla, Calif., 11-23 Aug. 1985 (NASA-CP-2376-VOL-10; NAS 1.55:2376-VOL-10) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

CONFERENCES, COSMIC RAYS, EXTRATERRESTRIAL RADIATION, INDEXES (DOCUMENTATION)

**N86-31483\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**NINETEENTH INTERNATIONAL COSMIC RAY CONFERENCE. CONFERENCE PAPERS: INVITED RAPPORTEUR, HIGHLIGHT, MISCELLANEOUS, VOLUME 9**

F. C. JONES, comp. Feb. 1986 555 p Conference held in La Jolla, Calif., 11-23 Aug. 1985 (NASA-CP-2376-VOL-9; NAS 1.55:2376-VOL-9) Avail: NTIS HC as boxed set only \$200/MF A01 per volume or E99 per entire set CSCL 03B

COSMIC RAYS, ELEMENTARY PARTICLES, GAMMA RAYS

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GENERAL

**N77-16981\*#** National Aeronautics and Space Administration. Washington, D.C.

**ORIGINS OF NASA NAMES**

H. T. WELLS, S. H. WHITELEY, and C. E. KAREGEANNES 1976 237 p refs (NASA-SP-4402; LC-75-600069) Avail: NTIS MF A01; SOD HC \$3.65 CSCL 05B

Names are selected for NASA spaceflight projects and programs from various sources. Some have their foundations in mythology and astrology or legend and folklore. Some have historic connotations; others are based on a description of their mission, often resulting in an acronym. Included are names of launch vehicles, spacecraft, manned spaceflight programs, sounding rockets, and NASA field installations. This study is limited to names of approved projects through 1974; it does not include names of numerous projects which have been or are being studied or projects that were canceled or postponed before reaching actual flight.

Author

**N77-33030\*#** National Aeronautics and Space Administration. Washington, D.C.

**ESSAYS ON THE HISTORY OF ROCKETRY AND ASTRONAUTICS: PROCEEDINGS OF THE THIRD THROUGH THE SIXTH HISTORY SYMPOSIA OF THE INTERNATIONAL ACADEMY OF ASTRONAUTICS, VOLUME 1 History Report, 1590 - 1957**

R. C. HALL, ed. Sep. 1977 244 p refs Symp. held at Mar del Plata, Arg., 10 Oct. 1969; Constance, West Ger., 11-12 Oct. 1970; Brussels, 23 Sep. 1971 and Vienna, 13 Oct. 1972 2 Vol. (NASA-CP-2014-VOL-1) Avail: NTIS MF A01; SOD HC CSCL 22A

ASTRONAUTICS, HISTORIES, MILITARY TECHNOLOGY, ROCKET FLIGHT

**N77-33048\*#** National Aeronautics and Space Administration, Washington, D.C.

**ESSAYS ON THE HISTORY OF ROCKETRY AND ASTRONAUTICS: PROCEEDINGS OF THE THIRD THROUGH THE SIXTH HISTORY SYMPOSIA OF THE INTERNATIONAL ACADEMY OF ASTRONAUTICS, VOLUME 2 History Report, 1590 - 1957**

R. C. HALL, ed. 1977 476 p refs Symp. held at Mar. del Plata, Arg., 10 Oct. 1969; Constance, West Ger., 11-12 Oct. 1970; Brussels, 23 Sep. 1971; and Vienna, 13 Oct. 1972 2 Vol. (NASA-CP-2014-VOL-2) Avail: NTIS MF A01; SOD HC CSCL 19G

HISTORIES, ROCKET ENGINE DESIGN, ROCKET PROPELLANTS, SOLID PROPELLANT ROCKET ENGINES

**N78-12997\*#** National Aeronautics and Space Administration, Washington, D.C.

**ASTRONAUTICS AND AERONAUTICS, 1974: A CHRONOLOGY NASA History Series**

N. L. BRUN 1977 323 p refs (NASA-SP-4019; LC-65-60308) Avail: NTIS MF A01; SOD HC \$4.90 CSCL 05A

The 14th volume in the NASA series of day-by-day records of aeronautical and space events has somewhat narrowed its scope and selectivity in its brief accounts from immediately available, open sources. This year the emphasis is even more directly focused on concrete air and space activities. The text continues to reflect some events in other agencies and countries. Author

**N78-23010\*#** National Aeronautics and Space Administration, Washington, D.C.

**FOURTH NASA INTER-CENTER CONTROL SYSTEMS CONFERENCE**

Jan. 1978 504 p refs Conf. held at Boston, 4-5 Nov. 1969 (NASA-CP-007) Avail: NTIS HC A22/MF A01 CSCL 12B

AIRCRAFT CONTROL, COMMAND AND CONTROL, FLIGHT CONTROL

**N79-15887\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**HUMAN NEUROLOGICAL DEVELOPMENT: PAST, PRESENT AND FUTURE**

R. PELLIGRA, ed. Nov. 1978 60 p refs Symp. held at Moffett Field, Calif., 18 May 1978; sponsored in part by Inst. for the Achievement of Human Potential, Philadelphia, Pa. Original contains color illustrations (NASA-CP-2063; A-7630) Avail: NTIS HC A04/MF A01 CSCL 06P

BIOLOGICAL EVOLUTION, CHILDREN, CLINICAL MEDICINE, CONFERENCES, LIFE SUPPORT SYSTEMS, NEUROLOGY, THERAPY

**N80-20003\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**CONFERENCE OF REMOTE SENSING EDUCATORS (CORSE-78)**

Washington Mar. 1978 664 p refs Conf. held at Stanford, Calif., 26-30 Jun. 1978 (NASA-CP-2102; A-7755) Avail: NTIS HC A99/MF A01 CSCL 05I

COMPUTER ASSISTED INSTRUCTION, CONFERENCES, DATA PROCESSING, EDUCATION, IMAGE PROCESSING, PHOTOGRAMMETRY, TECHNOLOGY TRANSFER

**N81-12978\*#** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**IMPACT FOR THE 80'S: PROCEEDINGS OF A CONFERENCE ON SELECTED TECHNOLOGY FOR BUSINESS AND INDUSTRY**

Nov. 1980 238 p Conf. held in Cleveland, 14-15 May 1980 (NASA-CP-2149; E-489) Avail: NTIS HC A11/MF A01 CSCL 05A

CONFERENCES, ELECTRIC HYBRID VEHICLES, ELECTRIC MOTOR VEHICLES, ENERGY TECHNOLOGY, PROPULSION SYSTEM PERFORMANCE

**N81-14944\*#** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**SPACE PLASMA PHYSICS ACTIVE EXPERIMENTS**

W. T. ROBERTS, ed. Oct. 1980 239 p refs Presented at first meeting of the Spacelab Space Plasma Phys Expt. Working Group, Marshall Flight Center, Ala., 23-24 Sep. 1980 (NASA-CP-2165) Avail: NTIS HC A11/MF A01 CSCL 20I

CONFERENCES, EXPERIMENT DESIGN, PLASMAS (PHYSICS), SPACE PLASMAS, SPACEBORNE EXPERIMENTS, SPACELAB PAYLOADS

**N81-16973\*#** National Aeronautics and Space Administration, Washington, D.C.

**ASTRONAUTICS AND AERONAUTICS, 1975. A CHRONOLOGY**

N. L. BRUN and E. H. RITCHIE 1979 331 p (NASA-SP-4020; LC-65-60308) Avail: NTIS MF A01; SOD HC \$7.00 CSCL 05D

The major NASA launches are presented including the sounding rocket launches. Also included are the satellites, space probes, and manned space flights for the year. T.M.

**N81-21995\*#** National Aeronautics and Space Administration, Washington, D.C.

**A CATALOG OF NASA SPECIAL PUBLICATIONS**

1981 110 p (NASA-SP-449) Avail: NTIS HC A06/MF A01 CSCL 05B

A list of all of the special publications released by NASA are presented. The list includes scientific and technical books covering a wide variety of topics, including much of the agencies research and development work, its full range of space exploration programs, its work in advancing aeronautics technology, and many associated historical and managerial efforts. A total of 1200 titles are presented. R.C.T.

**N84-25602\*#** National Aeronautics and Space Administration, Washington, D.C.

**ASTRONAUTICS AND AERONAUTICS, 1976. A CHRONOLOGY**

E. H. RITCHIE 1984 392 p (NASA-SP-4021; NAS 1.21:4021) Avail: NTIS HC A17/MF A01 CSCL 05D

A chronology of events concerning astronautics and aeronautics for the year 1976 is presented. Some of the many and varied topics include the aerospace industry, planetary exploration, space transportation system, defense department programs, politics, and aerospace medicine. The entries are organized by the month and presented in a news release format. M.A.C.

**N85-35142\*#** National Aeronautics and Space Administration, Washington, D.C.

**A SPACEFARING PEOPLE: PERSPECTIVES ON EARLY SPACEFLIGHT**

A. ROLAND 1985 158 p refs Proc. of a Conf. on the History of Space Activity, New Haven, Conn., 6-7 Feb. 1981 /Its the NASA History Series (NASA-SP-4405; NAS 1.12/6:4405; LC-84-979) Avail: NTIS HC A08/MF A01; also available SOD HC \$3.50 as 033-000-009-33-0 CSCL 22A

The early years of space flight are discussed. An historical perspective is offered. Satellites and politics, management of large



scale technology, the state of the literature of space, the domestic and international ramifications of space activity, and rationales for space exploration are discussed. For individual titles see N85-35143 through N85-35150.

**N86-16185\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SEARCHING THE HORIZON: A HISTORY OF AMES RESEARCH CENTER, 1940-1976**

E. A. MUENGER 1985 314 p refs  
(NASA-SP-4304; NAS 1.21:4304) Avail: NTIS MF A01; SOD HC \$13.00 as 033-000-0096-6 CSCL 05D

A history of the Ames Research Center from 1940 to 1976 is presented. The evolution and some of the facility's accomplishments are recounted. G.L.C.

**N86-31524\*#** National Aeronautics and Space Administration, Washington, D.C.

**ASTRONAUTICS AND AERONAUTICS, 1977: A CHRONOLOGY**

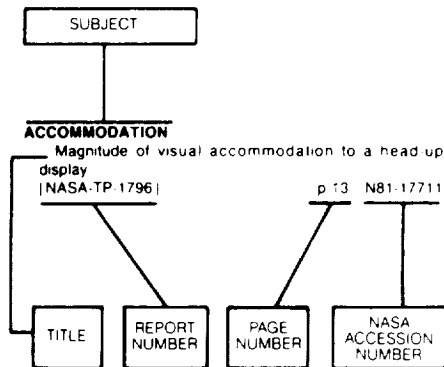
E. H. RITCHIE 1986 323 p  
(NASA-SP-4022; NAS 1.21:4022) Avail: NTIS HC A14/MF A01 CSCL 05D

This publication is a chronology of events during the year 1977 in the fields of aeronautical and space research, development, activity, and policy. It includes appendixes, an index, and illustrations. Chronological entries list sources for further inquiry.

Author



### Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

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## P-531 HELICOPTER

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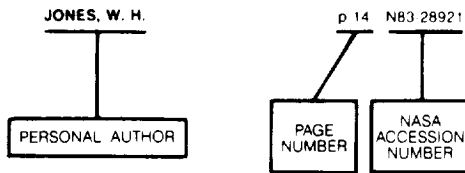


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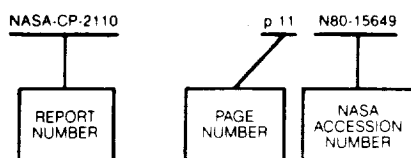
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NASA-RP-1066	p 139	N81-11438	NASA-RP-1158	p 166	N86-13866	NASA-SP-442	p 199	N80-27219
NASA-RP-1067	p 139	N81-21437	NASA-RP-1160	p 156	N86-22022	NASA-SP-443	p 62	N81-16075
NASA-RP-1068-VOL-2	p 207	N82-16028	NASA-RP-1161	p 126	N86-26639	NASA-SP-444	p 206	N80-26239
NASA-RP-1068	p 206	N81-25012	NASA-RP-1162	p 156	N86-25911	NASA-SP-445	p 3	N81-15969
NASA-RP-1069	p 209	N81-23004	NASA-RP-1163	p 157	N86-29425	NASA-SP-446	p 206	N81-15925
NASA-RP-1070	p 162	N81-15640	NASA-RP-1164	p 157	N86-28562	NASA-SP-447	p 170	N83-25349
NASA-RP-1071	p 162	N81-16678	NASA-RP-1165	p 157	N86-29428	NASA-SP-448	p 81	N81-18096
NASA-RP-1072	p 162	N81-15639	NASA-RP-1166	p 156	N86-27835	NASA-SP-449	p 212	N81-21995
NASA-RP-1073	p 163	N81-16679	NASA-RP-1167	p 156	N86-25900	NASA-SP-450	p 203	N81-27008
NASA-RP-1074	p 71	N81-19218	NASA-RP-1169	p 167	N86-28574	NASA-SP-451	p 207	N82-26152
NASA-RP-1075	p 116	N82-29579	NASA-RP-1174	p 126	N86-32763	NASA-SP-453	p 204	N82-21118
NASA-RP-1076	p 145	N81-27622				NASA-SP-454	p 66	N82-20225
NASA-RP-1077	p 183	N81-27865	NASA-SP-221(06)	p 132	N84-18677	NASA-SP-455	p 146	N82-28783
NASA-RP-1078	p 141	N83-10458	NASA-SP-222(06)	p 133	N84-21899	NASA-SP-456	p 200	N82-25027
NASA-RP-1079	p 73	N82-16153	NASA-SP-223(05)	p 130	N81-71594	NASA-SP-457	p 165	N83-14835
NASA-RP-1080-VOL-1	p 73	N82-16147	NASA-SP-224(05)	p 130	N81-71592	NASA-SP-458	p 154	N82-32915
NASA-RP-1080-VOL-2	p 73	N82-16148	NASA-SP-301	p 6	N77-85474	NASA-SP-459	p 168	N84-10718
NASA-RP-1080-VOL-3	p 73	N82-16149	NASA-SP-345	p 203	N77-12959	NASA-SP-460	p 36	N83-20931
NASA-RP-1080-VOL-4	p 73	N82-16150	NASA-SP-349	p 205	N77-28055	NASA-SP-461	p 207	N83-30340
NASA-RP-1080-VOL-5	p 73	N82-16151	NASA-SP-360	p 138	N80-10537	NASA-SP-462	p 36	N84-15144
NASA-RP-1080-VOL-6	p 73	N82-16152	NASA-SP-362	p 61	N78-21174	NASA-SP-463	p 204	N83-32693
NASA-RP-1081	p 153	N82-13592	NASA-SP-365-PT-1	p 151	N78-11545	NASA-SP-464	p 118	N83-27200
NASA-RP-1082(03)	p 100	N83-29491	NASA-SP-365-PT-2	p 151	N78-11552	NASA-SP-465	p 142	N84-14563
NASA-RP-1082	p 100	N82-15270	NASA-SP-370-PT-1	p 203	N78-12925	NASA-SP-466	p 202	N84-22516
NASA-RP-1083	p 168	N82-16683	NASA-SP-370-PT-2	p 203	N78-12958	NASA-SP-467	p 200	N85-23457
NASA-RP-1084	p 192	N82-15853	NASA-SP-377	p 169	N77-33780	NASA-SP-468	p 5	N85-32089
NASA-RP-1085	p 176	N82-21907	NASA-SP-380	p 140	N82-12492	NASA-SP-469	p 200	N85-18888
NASA-RP-1086	p 140	N82-19647	NASA-SP-394	p 6	N78-11007	NASA-SP-470	p 197	N83-33792
NASA-RP-1087	p 115	N82-29577	NASA-SP-398	p 157	N77-10755	NASA-SP-471	p 204	N84-19253
NASA-RP-1088-VOL-2	p 153	N82-19734	NASA-SP-399	p 136	N79-17279	NASA-SP-472	p 4	N85-28912
NASA-RP-1089	p 133	N84-33832	NASA-SP-4009-VOL-4	p 98	N80-20437	NASA-SP-473	p 67	N84-24632
NASA-RP-1090	p 192	N83-27809	NASA-SP-400	p 60	N77-27155	NASA-SP-474	p 208	N84-35242
NASA-RP-1091	p 176	N82-29904	NASA-SP-4011	p 61	N78-25115	NASA-SP-475	p 208	N85-22323
NASA-RP-1092-REV	p 82	N83-31730	NASA-SP-4019	p 212	N78-12997	NASA-SP-476	p 175	N85-28562
NASA-RP-1093	p 207	N83-25636	NASA-SP-401	p 65	N77-29189	NASA-SP-477	p 175	N85-32777
NASA-RP-1094	p 182	N85-19733	NASA-SP-4020	p 212	N81-16973	NASA-SP-478	p 169	N85-32708
NASA-RP-1095	p 164	N82-29826	NASA-SP-4021	p 212	N84-25602	NASA-SP-479	p 208	N86-11137
NASA-RP-1096	p 164	N82-28880	NASA-SP-4022	p 213	N86-31524	NASA-SP-480	p 63	N85-33126
NASA-RP-1097	p 207	N83-12031	NASA-SP-402	p 209	N79-22991	NASA-SP-481	p 196	N85-16665
NASA-RP-1098	p 154	N83-16992	NASA-SP-403	p 152	N80-23912	NASA-SP-482	p 196	N85-24994
NASA-RP-1099	p 146	N83-14684	NASA-SP-404	p 199	N79-34118	NASA-SP-483	p 174	N85-32772
NASA-RP-1100	p 141	N83-23660	NASA-SP-406	p 8	N78-24046	NASA-SP-485	p 38	N86-30720
NASA-RP-1101	p 116	N83-28410	NASA-SP-408	p 70	N76-28296	NASA-SP-7011(280)	p 170	N86-23265
NASA-RP-1102	p 110	N83-24800	NASA-SP-409	p 6	N78-12017	NASA-SP-7011(288)	p 171	N86-32088
NASA-RP-1103	p 110	N83-22546	NASA-SP-4102	p 196	N83-18551	NASA-SP-7037(196)	p 5	N86-23552
NASA-RP-1104	p 77	N83-24549	NASA-SP-4103-VOL-1	p 4	N85-23683	NASA-SP-7037(204)	p 5	N86-32389
NASA-RP-1105	p 123	N83-27214	NASA-SP-4103-VOL-2	p 4	N85-23684	NASA-SP-7038(08)	p 198	N86-26243
NASA-RP-1106	p 154	N83-27520	NASA-SP-410	p 157	N77-19709	NASA-SP-7039(29)-SECT-1	p 198	N86-28788
NASA-RP-1107	p 154	N83-28796	NASA-SP-411	p 170	N77-30735	NASA-SP-7039(29)-SECT-2	p 198	N86-28789
NASA-RP-1108	p 100	N84-13397	NASA-SP-412-VOL-2	p 138	N80-10538	NASA-SP-7041(50)	p 143	N86-31940
NASA-RP-1109	p 207	N84-32330	NASA-SP-412	p 60	N78-17088	NASA-SP-7043(40)	p 146	N84-21977
NASA-RP-1110	p 67	N83-32828	NASA-SP-413	p 60	N77-21106	NASA-SP-7044	p 144	N77-16437
NASA-RP-1111	p 103	N86-14498	NASA-SP-414	p 175	N77-12718	NASA-SP-7046(14)	p 63	N86-28104
NASA-RP-1112	p 165	N83-28828	NASA-SP-415	p 1	N77-21022	NASA-SP-7047	p 197	N83-32671
NASA-RP-1113	p 99	N83-32990	NASA-SP-416	p 28	N77-18081	NASA-SP-7048	p 197	N83-22010
NASA-RP-1115	p 174	N84-29465	NASA-SP-417	p 204	N77-15961	NASA-SP-7051(SUPPL-2)	p 198	N85-12785
NASA-RP-1116	p 165	N84-16720	NASA-SP-418	p 204	N77-27053	NASA-SP-7053-VOL-1	p 198	N86-20168
NASA-RP-1117	p 24	N84-27674	NASA-SP-419	p 175	N78-18771	NASA-SP-7053-VOL-2	p 198	N86-20169
NASA-RP-1118	p 202	N84-26520	NASA-SP-4203	p 61	N78-20151	NASA-SP-7056(02)	p 63	N86-28105
NASA-RP-1119	p 202	N84-26519	NASA-SP-4204	p 64	N79-12127	NASA-SP-7200	p 197	N79-13914
NASA-RP-1120	p 200	N84-34332	NASA-SP-4205	p 62	N79-28203	NASA-SP-7500(20)	p 196	N86-27108
NASA-RP-1121	p 82	N84-23698	NASA-SP-4206	p 72	N81-29154	NASA-SP-7601-SUPPL-1	p 151	N79-13601
NASA-RP-1122	p 103	N85-13156	NASA-SP-4208	p 63	N84-25737			
NASA-RP-1123	p 124	N84-27041	NASA-SP-4209	p 61	N79-10074	NASA-TP-1001	p 185	N77-30908
NASA-RP-1124	p 82	N84-26751	NASA-SP-420	p 205	N77-29046	NASA-TP-1002	p 158	N77-32688
NASA-RP-1125	p 74	N85-11127	NASA-SP-4210	p 65	N78-15149	NASA-TP-1003	p 158	N77-32689
NASA-RP-1126	p 124	N84-31640	NASA-SP-4211	p 200	N81-20962	NASA-TP-1004	p 46	N80-15129
NASA-RP-1127	p 134	N85-10405	NASA-SP-4212	p 208	N84-35248	NASA-TP-1005	p 144	N77-30617
NASA-RP-1128	p 190	N85-11789	NASA-SP-4213	p 170	N86-21097	NASA-TP-1006	p 178	N78-10746
NASA-RP-1129	p 134	N85-11378	NASA-SP-421	p 201	N77-34063	NASA-TP-1007	p 42	N78-16053
NASA-RP-1131	p 99	N84-33613	NASA-SP-422	p 104	N78-13371	NASA-TP-1008	p 185	N77-30909
NASA-RP-1132	p 60	N85-18991	NASA-SP-423	p 205	N78-30025	NASA-TP-1009	p 5	N77-33111
NASA-RP-1133	p 60	N86-18328	NASA-SP-424	p 61	N78-27146	NASA-TP-1010	p 31	N78-10048
NASA-RP-1134	p 193	N85-27665	NASA-SP-425	p 205	N79-12984	NASA-TP-1011	p 70	N78-13119
NASA-RP-1135	p 37	N85-33116	NASA-SP-426	p 209	N79-20961	NASA-TP-1012	p 113	N77-32458
NASA-RP-1136	p 155	N85-19550	NASA-SP-427	p 138	N78-31508	NASA-TP-1013	p 185	N78-12800
NASA-RP-1137	p 208	N85-21099	NASA-SP-428	p 62	N79-32225	NASA-TP-1014	p 147	N77-32622
NASA-RP-1138	p 185	N85-19784	NASA-SP-429	p 207	N81-25992	NASA-TP-1015	p 1	N77-32072
NASA-RP-1139	p 143	N85-30450	NASA-SP-4303	p 4	N85-17934	NASA-TP-1016	p 100	N77-30367
NASA-RP-1140	p 155	N85-25970	NASA-SP-4304	p 213	N86-16185	NASA-TP-1017	p 104	N77-30413
NASA-RP-1141	p 155	N85-27422	NASA-SP-430	p 170	N79-13686	NASA-TP-1018	p 5	N77-30089
NASA-RP-1142	p 83	N85-26923	NASA-SP-431	p 139	N81-20489	NASA-TP-1019	p 98	N77-30296
NASA-RP-1143	p 150	N86-16748	NASA-SP-432	p 68	N80-30367	NASA-TP-1020	p 5	N77-33112
NASA-RP-1144	p 155	N86-11700	NASA-SP-433	p 117	N80-11414	NASA-TP-1021	p 147	N78-13628
NASA-RP-1145	p 191	N86-24391	NASA-SP-434	p 201	N80-11966	NASA-TP-1022	p 32	N78-16042
NASA-RP-1147	p 76	N85-30005	NASA-SP-435	p 34	N80-18028	NASA-TP-1023	p 76	N77-32229
NASA-RP-1148	p 155	N86-13850	NASA-SP-436	p 206	N80-27260	NASA-TP-1024	p 111	N84-10504
NASA-RP-1149	p 156	N86-23088	NASA-SP-437	p 182	N80-13839	NASA-TP-1025	p 31	N78-10049
NASA-RP-1150	p 135	N86-10579	NASA-SP-438	p 206	N80-16998	NASA-TP-1026	p 199	N77-33003
NASA-RP-1151	p 166	N86-13867	NASA-SP-439	p 206	N81-10910	NASA-TP-1027	p 7	N78-13016

NASA-TP-1028	p 41	N77-31152	NASA-TP-1125	p 91	N78-15277	NASA-TP-1220	p 92	N78-22233
NASA-TP-1029	p 104	N77-31441	NASA-TP-1126	p 7	N78-14998	NASA-TP-1221	p 54	N79-13057
NASA-TP-1030	p 118	N77-31502	NASA-TP-1127	p 65	N78-17127	NASA-TP-1222	p 54	N79-17872
NASA-TP-1031	p 41	N77-31153	NASA-TP-1128	p 86	N78-15229	NASA-TP-1223	p 151	N78-21691
NASA-TP-1032	p 5	N77-32082	NASA-TP-1129	p 91	N78-15278	NASA-TP-1224	p 9	N78-28057
NASA-TP-1033	p 91	N77-33348	NASA-TP-1130	p 119	N78-18429	NASA-TP-1225	p 144	N78-23571
NASA-TP-1034	p 41	N77-31154	NASA-TP-1131	p 86	N78-15230	NASA-TP-1226	p 9	N78-30052
NASA-TP-1035	p 91	N77-32312	NASA-TP-1132	p 7	N78-17998	NASA-TP-1227	p 105	N78-23390
NASA-TP-1036	p 41	N77-32153	NASA-TP-1133	p 104	N78-18363	NASA-TP-1228	p 42	N78-23095
NASA-TP-1037	p 104	N77-32431	NASA-TP-1134	p 104	N78-17338	NASA-TP-1229	p 119	N78-25433
NASA-TP-1038	p 147	N78-12554	NASA-TP-1135	p 32	N78-18044	NASA-TP-1230	p 119	N78-22377
NASA-TP-1039	p 167	N78-12645	NASA-TP-1136	p 8	N78-20080	NASA-TP-1231	p 98	N78-22257
NASA-TP-1040	p 53	N78-16063	NASA-TP-1137	p 127	N78-18459	NASA-TP-1232	p 127	N78-28481
NASA-TP-1041	p 147	N78-11520	NASA-TP-1138	p 117	N78-16354	NASA-TP-1233	p 9	N78-30053
NASA-TP-1042	p 29	N78-10034	NASA-TP-1139	p 104	N78-16326	NASA-TP-1234	p 53	N78-25101
NASA-TP-1043	p 53	N78-13071	NASA-TP-1140	p 53	N78-20143	NASA-TP-1235	p 193	N78-27906
NASA-TP-1044	p 6	N78-12038	NASA-TP-1141	p 191	N78-20927	NASA-TP-1236	p 127	N78-28482
NASA-TP-1045	p 65	N78-10186	NASA-TP-1142	p 98	N78-18252	NASA-TP-1237	p 53	N78-23100
NASA-TP-1046	p 31	N78-11053	NASA-TP-1143	p 105	N78-23389	NASA-TP-1238	p 138	N78-23538
NASA-TP-1047	p 6	N78-12039	NASA-TP-1144	p 193	N78-20948	NASA-TP-1239	p 158	N78-27706
NASA-TP-1048	p 186	N78-12801	NASA-TP-1145	p 70	N78-21200	NASA-TP-1240	p 32	N78-27111
NASA-TP-1049	p 91	N78-12223	NASA-TP-1146	p 38	N78-20128	NASA-TP-1241	p 9	N78-30054
NASA-TP-1050	p 6	N78-10030	NASA-TP-1147	p 53	N78-20142	NASA-TP-1242	p 54	N78-30141
NASA-TP-1051	p 33	N80-12084	NASA-TP-1148	p 53	N78-18076	NASA-TP-1243	p 106	N79-14328
NASA-TP-1052	p 85	N77-32286	NASA-TP-1149	p 113	N78-17360	NASA-TP-1244	p 8	N78-23056
NASA-TP-1053	p 91	N77-33350	NASA-TP-1150	p 119	N78-20512	NASA-TP-1245	p 144	N78-28624
NASA-TP-1054	p 104	N77-32432	NASA-TP-1151	p 42	N78-20130	NASA-TP-1246	p 92	N78-25215
NASA-TP-1055	p 100	N78-11301	NASA-TP-1152	p 75	N78-17145	NASA-TP-1247	p 97	N78-25236
NASA-TP-1056	p 41	N77-33169	NASA-TP-1153	p 7	N78-17999	NASA-TP-1248	p 1	N78-25049
NASA-TP-1057	p 6	N78-11008	NASA-TP-1154	p 105	N78-22332	NASA-TP-1249	p 9	N78-30055
NASA-TP-1058	p 41	N77-32154	NASA-TP-1155	p 105	N78-18364	NASA-TP-1250	p 171	N79-19682
NASA-TP-1059	p 91	N78-10295	NASA-TP-1156	p 91	N78-20338	NASA-TP-1251	p 151	N78-26677
NASA-TP-1060	p 119	N77-33520	NASA-TP-1157	p 32	N78-20115	NASA-TP-1252	p 9	N78-31045
NASA-TP-1061	p 104	N77-33444	NASA-TP-1158	p 32	N78-25079	NASA-TP-1253	p 9	N78-30056
NASA-TP-1062	p 69	N78-10200	NASA-TP-1159	p 42	N78-23093	NASA-TP-1254	p 53	N78-26151
NASA-TP-1063	p 171	N78-11696	NASA-TP-1160	p 97	N78-20351	NASA-TP-1255	p 172	N78-31739
NASA-TP-1064	p 7	N78-14997	NASA-TP-1161	p 91	N78-20336	NASA-TP-1256	p 86	N78-26198
NASA-TP-1065	p 193	N78-12829	NASA-TP-1162	p 194	N78-20959	NASA-TP-1257	p 194	N78-26927
NASA-TP-1066	p 177	N77-33868	NASA-TP-1163	p 8	N78-20081	NASA-TP-1258	p 194	N78-30944
NASA-TP-1067	p 41	N78-11106	NASA-TP-1164	p 138	N78-18497	NASA-TP-1259	p 43	N78-28099
NASA-TP-1068	p 42	N78-21112	NASA-TP-1165	p 169	N78-18673	NASA-TP-1260	p 43	N78-27130
NASA-TP-1069	p 7	N78-13017	NASA-TP-1166	p 105	N78-22333	NASA-TP-1261	p 184	N78-30896
NASA-TP-1070	p 158	N78-11642	NASA-TP-1167	p 53	N78-20140	NASA-TP-1262	p 86	N78-26199
NASA-TP-1071	p 158	N78-15641	NASA-TP-1168	p 105	N78-21410	NASA-TP-1263	p 70	N79-15149
NASA-TP-1072	p 147	N78-11517	NASA-TP-1169	p 105	N78-20463	NASA-TP-1264	p 69	N78-28159
NASA-TP-1073	p 104	N78-15434	NASA-TP-1170	p 114	N78-21430	NASA-TP-1265	p 92	N78-28247
NASA-TP-1074	p 104	N78-18362	NASA-TP-1171	p 32	N78-20114	NASA-TP-1266	p 10	N79-14019
NASA-TP-1075	p 6	N78-12040	NASA-TP-1172	p 147	N78-20654	NASA-TP-1267	p 32	N78-27113
NASA-TP-1076	p 168	N79-28863	NASA-TP-1173	p 186	N78-23877	NASA-TP-1268	p 10	N79-12013
NASA-TP-1077	p 6	N78-12041	NASA-TP-1174	p 42	N78-23094	NASA-TP-1269	p 127	N78-32492
NASA-TP-1078	p 127	N78-12475	NASA-TP-1175	p 8	N78-22028	NASA-TP-1270	p 9	N78-33051
NASA-TP-1079	p 32	N78-13043	NASA-TP-1176	p 106	N78-33385	NASA-TP-1271	p 105	N78-28374
NASA-TP-1080	p 79	N78-13138	NASA-TP-1177	p 65	N78-21193	NASA-TP-1272	p 119	N78-28457
NASA-TP-1081	p 79	N78-16098	NASA-TP-1178	p 47	N81-11037	NASA-TP-1273	p 119	N78-28458
NASA-TP-1082	p 45	N79-28176	NASA-TP-1179	p 68	N78-20176	NASA-TP-1274	p 86	N78-28225
NASA-TP-1083	p 70	N77-33259	NASA-TP-1180	p 53	N78-21160	NASA-TP-1275	p 147	N78-33617
NASA-TP-1084	p 38	N78-13054	NASA-TP-1181	p 84	N78-23172	NASA-TP-1276	p 38	N78-31101
NASA-TP-1085	p 85	N84-11230	NASA-TP-1182	p 158	N78-23679	NASA-TP-1277	p 114	N78-28412
NASA-TP-1086	p 105	N78-26392	NASA-TP-1183	p 8	N78-25058	NASA-TP-1278	p 45	N79-28177
NASA-TP-1087	p 193	N78-11812	NASA-TP-1184	p 53	N78-27138	NASA-TP-1279	p 86	N78-28226
NASA-TP-1088	p 147	N78-12555	NASA-TP-1185	p 114	N78-21431	NASA-TP-1280	p 147	N78-28682
NASA-TP-1089	p 6	N78-13014	NASA-TP-1186	p 8	N78-25061	NASA-TP-1281	p 87	N79-13138
NASA-TP-1090	p 6	N78-11002	NASA-TP-1187	p 105	N78-28373	NASA-TP-1282	p 182	N78-31836
NASA-TP-1091	p 119	N78-10474	NASA-TP-1188	p 8	N78-26109	NASA-TP-1283	p 171	N78-32717
NASA-TP-1092	p 84	N78-12167	NASA-TP-1189	p 8	N78-25059	NASA-TP-1284	p 106	N78-30555
NASA-TP-1093	p 41	N78-13064	NASA-TP-1190	p 43	N78-26148	NASA-TP-1285	p 32	N79-14083
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NASA-TP-1095	p 91	N78-12222	NASA-TP-1192	p 84	N78-20281	NASA-TP-1287	p 119	N78-30585
NASA-TP-1096	p 86	N78-11230	NASA-TP-1193	p 86	N78-21269	NASA-TP-1288	p 127	N78-30610
NASA-TP-1097	p 76	N78-13124	NASA-TP-1194	p 42	N78-20131	NASA-TP-1289	p 108	N81-12356
NASA-TP-1098	p 113	N78-15463	NASA-TP-1195	p 42	N78-21113	NASA-TP-1290	p 11	N79-16803
NASA-TP-1099	p 7	N78-17000	NASA-TP-1196	p 119	N78-20513	NASA-TP-1291	p 9	N78-33050
NASA-TP-1100	p 65	N78-15142	NASA-TP-1197	p 91	N78-20337	NASA-TP-1292	p 147	N78-33616
NASA-TP-1101	p 7	N78-16000	NASA-TP-1198	p 92	N78-21295	NASA-TP-1293	p 92	N78-30238
NASA-TP-1102	p 105	N78-22331	NASA-TP-1199	p 42	N78-20132	NASA-TP-1294	p 9	N78-30057
NASA-TP-1103	p 186	N78-17823	NASA-TP-1200	p 178	N78-20806	NASA-TP-1295	p 43	N78-33110
NASA-TP-1104	p 84	N78-22188	NASA-TP-1201	p 194	N78-21922	NASA-TP-1296	p 86	N78-30205
NASA-TP-1105	p 181	N78-22809	NASA-TP-1202	p 119	N78-21473	NASA-TP-1297	p 106	N78-31384
NASA-TP-1106	p 52	N78-12100	NASA-TP-1203	p 119	N78-21470	NASA-TP-1298	p 43	N78-33107
NASA-TP-1107	p 65	N78-15143	NASA-TP-1204	p 42	N78-20133	NASA-TP-1299	p 10	N79-10022
NASA-TP-1108	p 7	N78-16001	NASA-TP-1205	p 42	N78-21114	NASA-TP-1300	p 178	N79-17580
NASA-TP-1109	p 42	N78-22101	NASA-TP-1206	p 53	N78-27136	NASA-TP-1301	p 187	N79-22849
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NASA-TP-1111	p 29	N78-13029	NASA-TP-1208	p 106	N78-32385	NASA-TP-1303	p 33	N79-15938
NASA-TP-1112	p 113	N78-13408	NASA-TP-1209	p 167	N78-21737	NASA-TP-1304	p 106	N79-10379
NASA-TP-1113	p 65	N78-28150	NASA-TP-1210	p 127	N78-26494	NASA-TP-1305	p 68	N78-33135
NASA-TP-1114	p 65	N78-13109	NASA-TP-1211	p 127	N78-28480	NASA-TP-1306	p 11	N79-20071
NASA-TP-1115	p 53	N78-20139	NASA-TP-1212	p 151	N78-21690	NASA-TP-1307	p 159	N79-13644
NASA-TP-1116	p 79	N78-18135	NASA-TP-1213	p 8	N78-28056	NASA-TP-1308	p 86	N78-31213
NASA-TP-1117	p 180	N78-18823	NASA-TP-1214	p 32	N78-30089	NASA-TP-1309	p 86	N78-30206
NASA-TP-1118	p 7	N78-17997	NASA-TP-1215	p 8	N78-25060	NASA-TP-1310	p 43	N78-31109
NASA-TP-1119	p 8	N78-21055	NASA-TP-1216	p 32	N78-30090	NASA-TP-1311	p 183	N78-31854
NASA-TP-1120	p 80	N78-20256	NASA-TP-1217	p 101	N79-14309	NASA-TP-1312	p 84	N79-12178
NASA-TP-1121	p 7	N78-20078	NASA-TP-1218	p 78	N78-21216	NASA-TP-1313	p 172	N78-31740
NASA-TP-1122	p 127	N78-20536	NASA-TP-1219-VOL-1	p 70	N78-25123	NASA-TP-1314	p 43	N78-33109
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NASA-TP-1317	p 106	N79-14327	NASA-TP-1415	p 148	N79-18479	NASA-TP-1511	p 121	N79-31605
NASA-TP-1318	p 84	N79-14177	NASA-TP-1416	p 101	N79-17139	NASA-TP-1512	p 55	N80-19126
NASA-TP-1319	p 59	N79-16877	NASA-TP-1417	p 196	N79-19912	NASA-TP-1513	p 55	N80-17081
NASA-TP-1320	p 195	N79-13901	NASA-TP-1418	p 136	N79-22580	NASA-TP-1514	p 33	N80-11068
NASA-TP-1321	p 186	N79-14874	NASA-TP-1419	p 11	N79-22038	NASA-TP-1515	p 13	N80-16032
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NASA-TP-1325	p 186	N79-13821	NASA-TP-1423	p 12	N79-23012	NASA-TP-1519	p 55	N79-33218
NASA-TP-1326	p 186	N79-14872	NASA-TP-1424	p 177	N80-16742	NASA-TP-1520	p 33	N79-33189
NASA-TP-1327	p 136	N78-33499	NASA-TP-1425	p 44	N79-25023	NASA-TP-1521	p 13	N80-11036
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NASA-TP-1330	p 12	N80-10101	NASA-TP-1427	p 12	N79-23013	NASA-TP-1523	p 45	N79-33210
NASA-TP-1331	p 10	N78-33053	NASA-TP-1428	p 128	N79-25427	NASA-TP-1524	p 93	N79-30381
NASA-TP-1332	p 54	N79-14110	NASA-TP-1429	p 80	N79-23141	NASA-TP-1525	p 93	N79-30380
NASA-TP-1333	p 205	N79-14978	NASA-TP-1430	p 187	N79-24773	NASA-TP-1526	p 148	N79-31841
NASA-TP-1334	p 148	N79-14591	NASA-TP-1431	p 55	N80-15138	NASA-TP-1527	p 101	N79-32467
NASA-TP-1335	p 186	N79-18687	NASA-TP-1432	p 187	N80-11869	NASA-TP-1528	p 177	N79-30947
NASA-TP-1336	p 10	N78-33054	NASA-TP-1433	p 148	N79-28796	NASA-TP-1529	p 148	N79-30844
NASA-TP-1337	p 43	N78-33108	NASA-TP-1434	p 12	N79-26020	NASA-TP-1530	p 121	N79-33475
NASA-TP-1338	p 43	N79-10060	NASA-TP-1435	p 33	N79-30176	NASA-TP-1531	p 45	N80-14123
NASA-TP-1339	p 120	N79-10425	NASA-TP-1436	p 54	N79-29195	NASA-TP-1532	p 46	N80-14124
NASA-TP-1340	p 148	N78-33618	NASA-TP-1437	p 92	N79-21205	NASA-TP-1533	p 12	N79-33164
NASA-TP-1341	p 87	N78-33196	NASA-TP-1438	p 120	N79-22518	NASA-TP-1534	p 128	N80-12438
NASA-TP-1342	p 119	N78-33447	NASA-TP-1439	p 84	N79-22246	NASA-TP-1535	p 13	N80-12994
NASA-TP-1343	p 92	N79-13158	NASA-TP-1440	p 144	N79-22626	NASA-TP-1536	p 13	N80-12995
NASA-TP-1344	p 69	N78-33137	NASA-TP-1441	p 178	N79-21798	NASA-TP-1537	p 33	N80-10193
NASA-TP-1345	p 10	N79-13003	NASA-TP-1442	p 87	N79-21184	NASA-TP-1538	p 55	N80-14136
NASA-TP-1346	p 120	N79-10424	NASA-TP-1443	p 120	N79-22519	NASA-TP-1539	p 13	N80-12065
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NASA-TP-1357	p 152	N79-13607	NASA-TP-1454	p 160	N79-22708	NASA-TP-1550	p 39	N80-28349
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NASA-TP-1361	p 186	N79-19813	NASA-TP-1458	p 120	N79-31604	NASA-TP-1554	p 64	N80-13135
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NASA-TP-1363	p 160	N79-21720	NASA-TP-1460	p 87	N79-28288	NASA-TP-1556	p 45	N80-14121
NASA-TP-1364	p 196	N79-16709	NASA-TP-1461	p 191	N79-25861	NASA-TP-1557	p 87	N80-11188
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NASA-TP-1367	p 128	N79-17264	NASA-TP-1464	p 152	N79-31864	NASA-TP-1560	p 29	N79-33171
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NASA-TP-1634	p 55	N80-21336	NASA-TP-1731	p 122	N81-14322	NASA-TP-1827	p 140	N82-20622
NASA-TP-1635	p 171	N80-34099	NASA-TP-1732	p 121	N80-33749	NASA-TP-1828	p 141	N82-20623
NASA-TP-1636	p 56	N80-25345	NASA-TP-1733	p 15	N80-32334	NASA-TP-1829	p 141	N82-20624
NASA-TP-1637	p 55	N80-24323	NASA-TP-1734	p 56	N81-12109	NASA-TP-1830	p 39	N81-20074
NASA-TP-1638	p 15	N80-24267	NASA-TP-1735	p 149	N81-11565	NASA-TP-1831	p 102	N81-28352
NASA-TP-1639	p 114	N80-22660	NASA-TP-1736	p 39	N81-13958	NASA-TP-1832	p 102	N81-30360
NASA-TP-1640	p 161	N80-22924	NASA-TP-1737	p 108	N81-13303	NASA-TP-1833	p 187	N81-21873
NASA-TP-1641	p 56	N81-19131	NASA-TP-1738	p 130	N81-11422	NASA-TP-1834	p 77	N81-20176
NASA-TP-1642	p 38	N80-23304	NASA-TP-1739	p 48	N81-13058	NASA-TP-1835	p 88	N81-20245
NASA-TP-1643	p 39	N80-32389	NASA-TP-1740	p 71	N81-13082	NASA-TP-1836	p 101	N81-20359
NASA-TP-1644	p 93	N80-21532	NASA-TP-1741	p 76	N80-33463	NASA-TP-1837	p 17	N81-20026
NASA-TP-1645	p 108	N80-22633	NASA-TP-1742	p 29	N81-12043	NASA-TP-1838	p 101	N81-22281
NASA-TP-1646	p 121	N80-19495	NASA-TP-1743	p 184	N81-12812	NASA-TP-1839	p 109	N81-28389
NASA-TP-1647	p 55	N80-22358	NASA-TP-1744	p 184	N81-10789	NASA-TP-1840	p 115	N81-25352
NASA-TP-1648	p 15	N80-24261	NASA-TP-1745	p 101	N80-33683	NASA-TP-1841	p 109	N81-24388
NASA-TP-1649	p 55	N80-23326	NASA-TP-1746	p 162	N81-13593	NASA-TP-1842	p 48	N81-24065
NASA-TP-1650	p 2	N80-19022	NASA-TP-1747	p 187	N81-14788	NASA-TP-1843	p 149	N81-22587
NASA-TP-1651	p 162	N80-23934	NASA-TP-1748	p 35	N81-12066	NASA-TP-1844	p 31	N81-29111
NASA-TP-1652	p 108	N80-23600	NASA-TP-1749	p 17	N81-22018	NASA-TP-1845	p 109	N81-23410
NASA-TP-1653	p 129	N80-22737	NASA-TP-1750	p 209	N81-13912	NASA-TP-1846	p 171	N81-23791
NASA-TP-1654	p 181	N80-25039	NASA-TP-1751	p 130	N81-13373	NASA-TP-1847	p 163	N81-23761
NASA-TP-1655	p 108	N80-21702	NASA-TP-1752	p 16	N81-10005	NASA-TP-1851	p 179	N82-33020
NASA-TP-1656	p 15	N80-25296	NASA-TP-1753	p 129	N81-11417	NASA-TP-1852	p 76	N81-31281
NASA-TP-1657	p 121	N80-21753	NASA-TP-1754	p 47	N81-11039	NASA-TP-1853	p 94	N82-16239
NASA-TP-1658	p 93	N80-22493	NASA-TP-1755	p 87	N81-16210	NASA-TP-1854	p 39	N81-24058
NASA-TP-1659	p 46	N80-21325	NASA-TP-1756	p 94	N81-14079	NASA-TP-1855	p 35	N81-24048
NASA-TP-1660	p 14	N80-22265	NASA-TP-1757	p 101	N81-11315	NASA-TP-1856	p 85	N81-27223
NASA-TP-1661	p 114	N80-24594	NASA-TP-1758	p 56	N81-13065	NASA-TP-1857	p 17	N81-22019
NASA-TP-1662	p 187	N80-27161	NASA-TP-1759	p 17	N81-22016	NASA-TP-1858	p 188	N81-22832
NASA-TP-1663	p 115	N82-19521	NASA-TP-1760	p 56	N81-13968	NASA-TP-1859	p 163	N81-23838
NASA-TP-1664	p 39	N80-30305	NASA-TP-1761	p 81	N81-16130	NASA-TP-1860	p 70	N81-23182
NASA-TP-1665	p 161	N80-23933	NASA-TP-1762	p 35	N81-16039	NASA-TP-1861	p 17	N81-24022
NASA-TP-1666	p 34	N80-25321	NASA-TP-1763	p 194	N81-13739	NASA-TP-1862	p 81	N81-24178
NASA-TP-1667	p 71	N80-29417	NASA-TP-1764	p 108	N81-12361	NASA-TP-1863	p 130	N81-24471
NASA-TP-1668	p 187	N80-23100	NASA-TP-1765	p 56	N81-20082	NASA-TP-1864	p 21	N83-30389
NASA-TP-1669	p 129	N80-22734	NASA-TP-1766	p 16	N81-14972	NASA-TP-1865	p 21	N83-30386
NASA-TP-1670	p 101	N80-21869	NASA-TP-1767	p 16	N81-12021	NASA-TP-1866	p 18	N81-31129
NASA-TP-1671	p 29	N80-27302	NASA-TP-1768	p 97	N81-24283	NASA-TP-1867	p 81	N81-24179
NASA-TP-1672	p 108	N80-26622	NASA-TP-1769	p 16	N81-16977	NASA-TP-1868	p 115	N82-22481
NASA-TP-1673	p 85	N80-25392	NASA-TP-1770	p 70	N81-18082	NASA-TP-1869	p 109	N81-31509
NASA-TP-1674	p 82	N83-28098	NASA-TP-1771	p 16	N81-15976	NASA-TP-1870	p 178	N81-25690
NASA-TP-1675	p 36	N82-32350	NASA-TP-1772	p 17	N81-22017	NASA-TP-1871	p 39	N81-26144
NASA-TP-1676	p 15	N80-28304	NASA-TP-1773	p 35	N81-22039	NASA-TP-1872	p 62	N81-26160
NASA-TP-1677	p 55	N80-23327	NASA-TP-1775	p 130	N81-14343	NASA-TP-1873	p 77	N81-24167
NASA-TP-1678	p 56	N80-29369	NASA-TP-1776	p 39	N81-14997	NASA-TP-1875	p 30	N81-31162
NASA-TP-1679	p 129	N80-27719	NASA-TP-1777	p 16	N81-14974	NASA-TP-1876	p 181	N81-30851
NASA-TP-1680	p 46	N80-25337	NASA-TP-1778	p 16	N81-19019	NASA-TP-1877	p 35	N81-30112
NASA-TP-1681	p 80	N80-27428	NASA-TP-1779	p 56	N81-13066	NASA-TP-1878	p 17	N81-29095
NASA-TP-1682	p 108	N80-25615	NASA-TP-1780	p 48	N81-16050	NASA-TP-1879	p 72	N81-29155
NASA-TP-1683	p 15	N80-27283	NASA-TP-1781	p 87	N81-19273	NASA-TP-1880	p 17	N81-29096
NASA-TP-1684	p 38	N80-27360	NASA-TP-1782	p 48	N81-15000	NASA-TP-1881	p 17	N81-26078
NASA-TP-1685	p 34	N80-29287	NASA-TP-1783	p 109	N81-15237	NASA-TP-1882	p 122	N82-25514
NASA-TP-1686	p 114	N80-25635	NASA-TP-1784	p 16	N81-13919	NASA-TP-1883	p 94	N81-33293
NASA-TP-1687	p 114	N80-24595	NASA-TP-1785	p 81	N81-16129	NASA-TP-1884	p 110	N82-30498
NASA-TP-1688	p 47	N80-25338	NASA-TP-1786	p 20	N83-16290	NASA-TP-1885	p 30	N81-29109
NASA-TP-1689	p 2	N80-29244	NASA-TP-1787	p 3	N81-13915	NASA-TP-1886	p 164	N82-15677
NASA-TP-1690	p 176	N81-27813	NASA-TP-1788-VOL-1	p 183	N81-21686	NASA-TP-1887	p 181	N81-29840
NASA-TP-1691	p 87	N80-32489	NASA-TP-1788-VOL-2	p 163	N81-21693	NASA-TP-1888	p 17	N81-29098
NASA-TP-1692	p 47	N80-25339	NASA-TP-1789	p 16	N81-14975	NASA-TP-1889	p 18	N81-30087
NASA-TP-1693	p 47	N80-28352	NASA-TP-1790	p 182	N81-22754	NASA-TP-1890	p 18	N81-30086
NASA-TP-1694	p 149	N80-27832	NASA-TP-1791	p 109	N81-16417	NASA-TP-1891	p 94	N81-27282
NASA-TP-1695	p 59	N80-31413	NASA-TP-1792	p 109	N81-24387	NASA-TP-1892	p 18	N81-30088
NASA-TP-1696	p 34	N80-25318	NASA-TP-1793	p 3	N81-14961	NASA-TP-1893	p 192	N81-27899
NASA-TP-1697	p 187	N80-32188	NASA-TP-1794	p 85	N81-14017	NASA-TP-1894	p 109	N81-29384
NASA-TP-1698	p 108	N80-33719	NASA-TP-1795	p 81	N81-14001	NASA-TP-1895	p 179	N81-33838
NASA-TP-1699	p 35	N80-30296	NASA-TP-1796	p 173	N81-17711	NASA-TP-1896	p 97	N81-29246
NASA-TP-1700	p 71	N80-32429	NASA-TP-1797	p 35	N81-16040	NASA-TP-1897	p 115	N81-33452
NASA-TP-1701	p 15	N80-32333	NASA-TP-1798	p 48	N82-13143	NASA-TP-1898	p 188	N81-33945
NASA-TP-1702	p 121	N80-27694	NASA-TP-1799	p 99	N81-20311	NASA-TP-1899	p 94	N81-31366

NASA-TP-1900	p 94	N81-31365	NASA-TP-1998	p 73	N82-20238	NASA-TP-2100	p 110	N83-16675
NASA-TP-1901	p 109	N81-32418	NASA-TP-1999	p 102	N82-25441	NASA-TP-2101	p 150	N83-16951
NASA-TP-1902	p 109	N82-11391	NASA-TP-2000	p 24	N84-28743	NASA-TP-2102	p 88	N83-18895
NASA-TP-1903	p 130	N82-11488	NASA-TP-2001	p 49	N82-22269	NASA-TP-2103	p 110	N83-24808
NASA-TP-1904	p 188	N81-33946	NASA-TP-2002	p 95	N82-22366	NASA-TP-2105	p 183	N83-16095
NASA-TP-1905	p 18	N82-12035	NASA-TP-2003	p 192	N82-23003	NASA-TP-2106	p 36	N83-18715
NASA-TP-1906	p 195	N82-32186	NASA-TP-2004	p 189	N84-10913	NASA-TP-2107	p 97	N83-16545
NASA-TP-1907	p 195	N82-32187	NASA-TP-2005	p 19	N82-22215	NASA-TP-2108	p 74	N83-19806
NASA-TP-1908	p 195	N82-32188	NASA-TP-2006	p 88	N82-22349	NASA-TP-2109	p 31	N83-18704
NASA-TP-1909	p 195	N82-32189	NASA-TP-2007	p 115	N82-23515	NASA-TP-2110	p 88	N83-16492
NASA-TP-1910	p 24	N84-27682	NASA-TP-2008	p 102	N82-23397	NASA-TP-2111	p 123	N83-16759
NASA-TP-1911	p 57	N82-20187	NASA-TP-2009	p 35	N82-24193	NASA-TP-2112	p 49	N83-17547
NASA-TP-1912	p 77	N81-33231	NASA-TP-2010	p 131	N82-26703	NASA-TP-2113	p 88	N83-16491
NASA-TP-1913	p 188	N81-33947	NASA-TP-2011	p 4	N82-26217	NASA-TP-2114	p 50	N83-18727
NASA-TP-1914	p 3	N82-11013	NASA-TP-2012	p 19	N82-25193	NASA-TP-2115	p 110	N83-16674
NASA-TP-1915	p 39	N81-33203	NASA-TP-2013	p 19	N82-26231	NASA-TP-2116	p 21	N83-25666
NASA-TP-1916	p 56	N82-10041	NASA-TP-2014	p 85	N82-22330	NASA-TP-2117	p 81	N83-16400
NASA-TP-1917	p 130	N82-10430	NASA-TP-2015	p 81	N82-25325	NASA-TP-2118	p 36	N83-18714
NASA-TP-1918	p 35	N82-11050	NASA-TP-2016	p 62	N82-29335	NASA-TP-2119	p 22	N84-10025
NASA-TP-1919	p 18	N82-11033	NASA-TP-2017	p 21	N83-25665	NASA-TP-2120	p 21	N83-26821
NASA-TP-1920	p 18	N81-31128	NASA-TP-2018	p 20	N82-26234	NASA-TP-2121	p 189	N83-34713
NASA-TP-1921	p 35	N81-31185	NASA-TP-2020	p 49	N82-25250	NASA-TP-2122	p 40	N84-13182
NASA-TP-1922	p 153	N82-12687	NASA-TP-2022	p 142	N83-29750	NASA-TP-2123	p 88	N83-19889
NASA-TP-1923	p 59	N82-11090	NASA-TP-2023	p 49	N83-11125	NASA-TP-2124	p 110	N83-16680
NASA-TP-1924	p 164	N82-13620	NASA-TP-2024	p 19	N82-26232	NASA-TP-2125	p 21	N83-22162
NASA-TP-1925	p 94	N81-33292	NASA-TP-2025	p 20	N82-26235	NASA-TP-2126	p 57	N83-19758
NASA-TP-1926	p 18	N82-13107	NASA-TP-2026	p 36	N82-29311	NASA-TP-2127	p 111	N83-28378
NASA-TP-1927	p 35	N82-16068	NASA-TP-2027	p 122	N82-26678	NASA-TP-2128	p 57	N84-13198
NASA-TP-1928	p 109	N82-13383	NASA-TP-2028	p 49	N82-31329	NASA-TP-2129	p 85	N83-19825
NASA-TP-1929	p 196	N83-23189	NASA-TP-2029	p 20	N82-29270	NASA-TP-2130	p 168	N83-24133
NASA-TP-1930	p 196	N83-23188	NASA-TP-2030	p 20	N82-28247	NASA-TP-2131	p 50	N83-23309
NASA-TP-1931	p 22	N83-32774	NASA-TP-2031	p 150	N82-27867	NASA-TP-2132	p 50	N83-32806
NASA-TP-1932	p 178	N82-11784	NASA-TP-2032	p 131	N82-28665	NASA-TP-2133	p 20	N83-22161
NASA-TP-1933	p 72	N82-15116	NASA-TP-2033	p 57	N83-16350	NASA-TP-2134	p 189	N83-30164
NASA-TP-1934	p 18	N82-11032	NASA-TP-2034	p 20	N83-11058	NASA-TP-2135	p 36	N83-22191
NASA-TP-1935	p 117	N82-12431	NASA-TP-2035	p 31	N83-29193	NASA-TP-2136	p 36	N83-22192
NASA-TP-1936	p 172	N82-14804	NASA-TP-2036	p 122	N83-11496	NASA-TP-2137	p 142	N83-27293
NASA-TP-1937	p 72	N82-14276	NASA-TP-2037	p 122	N82-32737	NASA-TP-2138	p 192	N83-23140
NASA-TP-1938	p 149	N82-12654	NASA-TP-2038	p 110	N82-31646	NASA-TP-2139	p 89	N83-24641
NASA-TP-1939	p 77	N82-11109	NASA-TP-2039	p 150	N82-28839	NASA-TP-2140	p 88	N83-21110
NASA-TP-1940	p 48	N82-13142	NASA-TP-2040	p 122	N82-31691	NASA-TP-2141	p 132	N83-33216
NASA-TP-1941	p 140	N82-13468	NASA-TP-2042	p 36	N82-31321	NASA-TP-2142	p 50	N83-25712
NASA-TP-1942	p 48	N82-14090	NASA-TP-2043	p 20	N82-32320	NASA-TP-2143	p 36	N83-31596
NASA-TP-1943	p 19	N82-14051	NASA-TP-2044	p 20	N82-30291	NASA-TP-2144	p 195	N83-21991
NASA-TP-1944	p 94	N82-19373	NASA-TP-2045	p 164	N83-14824	NASA-TP-2145	p 111	N84-22907
NASA-TP-1945	p 49	N82-15040	NASA-TP-2046	p 188	N82-31069	NASA-TP-2146	p 123	N83-35400
NASA-TP-1946	p 49	N82-15039	NASA-TP-2047	p 122	N82-32736	NASA-TP-2147	p 154	N84-10675
NASA-TP-1947	p 94	N82-19374	NASA-TP-2048	p 95	N82-32491	NASA-TP-2148	p 85	N83-24575
NASA-TP-1948	p 3	N82-14049	NASA-TP-2049	p 49	N82-33389	NASA-TP-2149	p 89	N83-24640
NASA-TP-1949	p 66	N82-14203	NASA-TP-2050	p 122	N83-13457	NASA-TP-2150	p 74	N83-22317
NASA-TP-1950	p 66	N82-15106	NASA-TP-2051	p 150	N83-13643	NASA-TP-2151	p 21	N83-22166
NASA-TP-1951	p 18	N82-13108	NASA-TP-2052	p 51	N84-28795	NASA-TP-2152	p 82	N83-24562
NASA-TP-1952	p 18	N82-13106	NASA-TP-2053	p 85	N83-18863	NASA-TP-2153	p 82	N83-24561
NASA-TP-1953	p 19	N82-14052	NASA-TP-2054	p 20	N82-32322	NASA-TP-2154	p 123	N83-24862
NASA-TP-1954	p 145	N82-16477	NASA-TP-2055	p 131	N83-12449	NASA-TP-2155	p 182	N83-25438
NASA-TP-1955	p 66	N82-14202	NASA-TP-2056	p 97	N83-11340	NASA-TP-2156	p 50	N83-24509
NASA-TP-1956	p 149	N82-14672	NASA-TP-2057	p 49	N83-10045	NASA-TP-2157	p 21	N83-27959
NASA-TP-1958	p 19	N82-14055	NASA-TP-2058	p 49	N83-11126	NASA-TP-2158	p 21	N83-24478
NASA-TP-1959	p 35	N82-18204	NASA-TP-2059	p 95	N83-14269	NASA-TP-2159	p 21	N83-30391
NASA-TP-1960	p 39	N82-14085	NASA-TP-2060	p 194	N83-13979	NASA-TP-2160	p 132	N83-28491
NASA-TP-1961	p 72	N82-14277	NASA-TP-2061	p 88	N83-15413	NASA-TP-2161	p 95	N83-24695
NASA-TP-1962	p 19	N82-20156	NASA-TP-2062	p 110	N83-12360	NASA-TP-2162	p 102	N83-25985
NASA-TP-1963	p 39	N82-20180	NASA-TP-2063	p 95	N83-16528	NASA-TP-2163	p 88	N83-23419
NASA-TP-1964	p 188	N82-14879	NASA-TP-2065	p 74	N82-33421	NASA-TP-2164	p 142	N83-26201
NASA-TP-1965	p 24	N84-27694	NASA-TP-2066	p 81	N82-31451	NASA-TP-2165	p 179	N84-27461
NASA-TP-1966	p 57	N82-19225	NASA-TP-2067	p 57	N83-11139	NASA-TP-2166	p 116	N83-33126
NASA-TP-1967	p 109	N82-20467	NASA-TP-2068	p 20	N83-10016	NASA-TP-2167	p 21	N83-31577
NASA-TP-1968	p 188	N82-21036	NASA-TP-2069	p 69	N82-33417	NASA-TP-2168	p 209	N83-25646
NASA-TP-1969	p 150	N82-19707	NASA-TP-2070	p 131	N83-10442	NASA-TP-2169	p 89	N83-32908
NASA-TP-1970	p 188	N82-24052	NASA-TP-2071	p 25	N85-10920	NASA-TP-2171	p 50	N83-26839
NASA-TP-1971	p 19	N82-26227	NASA-TP-2072	p 188	N82-34189	NASA-TP-2172	p 146	N83-36549
NASA-TP-1972	p 59	N83-17560	NASA-TP-2073	p 4	N82-31294	NASA-TP-2173	p 184	N83-27679
NASA-TP-1973	p 130	N82-20566	NASA-TP-2074	p 131	N83-11513	NASA-TP-2174	p 132	N83-34373
NASA-TP-1974	p 49	N82-19222	NASA-TP-2075	p 188	N82-34190	NASA-TP-2175	p 123	N83-28453
NASA-TP-1976	p 188	N82-21037	NASA-TP-2076	p 150	N83-12595	NASA-TP-2176	p 22	N83-36000
NASA-TP-1977	p 81	N82-22317	NASA-TP-2077	p 154	N82-33918	NASA-TP-2177	p 184	N83-35736
NASA-TP-1978	p 31	N82-22239	NASA-TP-2078	p 20	N83-11059	NASA-TP-2178	p 210	N83-29169
NASA-TP-1979	p 164	N82-24790	NASA-TP-2079	p 189	N83-11838	NASA-TP-2179	p 180	N83-28921
NASA-TP-1980	p 99	N82-19390	NASA-TP-2080	p 122	N83-16758	NASA-TP-2180	p 111	N83-34229
NASA-TP-1981	p 130	N82-20567	NASA-TP-2081	p 59	N83-18770	NASA-TP-2181	p 189	N83-33684
NASA-TP-1982	p 130	N82-20565	NASA-TP-2082	p 40	N83-18723	NASA-TP-2182	p 118	N83-32044
NASA-TP-1983	p 57	N82-24209	NASA-TP-2083	p 131	N83-14521	NASA-TP-2183	p 57	N84-12190
NASA-TP-1984	p 35	N82-23244	NASA-TP-2084	p 189	N83-16149	NASA-TP-2184	p 22	N83-32776
NASA-TP-1985	p 88	N82-20291	NASA-TP-2085	p 40	N83-17535	NASA-TP-2185	p 194	N83-27846
NASA-TP-1986	p 94	N82-20316	NASA-TP-2086	p 184	N83-10876	NASA-TP-2186	p 60	N83-36039
NASA-TP-1987	p 49	N82-20183	NASA-TP-2087	p 30	N83-14077	NASA-TP-2187	p 82	N83-33956
NASA-TP-1988	p 69	N82-20236	NASA-TP-2088	p 146	N83-18024	NASA-TP-2188	p 50	N83-30431
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